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## Electric Trucks Reduce Hauling Cost

Fleet Is Used for Inter-Departmental Hauls by Cash  
Register Maker—Helps Speed Production—  
Method of Handling Emergency Calls

BY BURNHAM FINNEY\*

**W**HEN a company expands its operations to a point where production is carried on in a number of separate buildings, economical transportation be-

tween departments becomes a major problem. In case this expansion results in the construction of buildings which occupy four city blocks, including two blocks on both sides of a main thoroughfare, the seriousness of the problem is more intensified. Such is the situation at the National Cash Register Co., Dayton, Ohio, and a solution has been found in the effective functioning of a transportation department.

This department is charged with all inter-departmental hauls of materials. It is manned by 54 men, including 37 electric truck operators, three truck helpers, seven central station overhead conveyor operators, three parcel-post truck operators, two checkers, a job foreman and an assistant foreman. Equipment consists of two tier lift trucks, 35 electric trucks and a large number of different types of truck trailers.

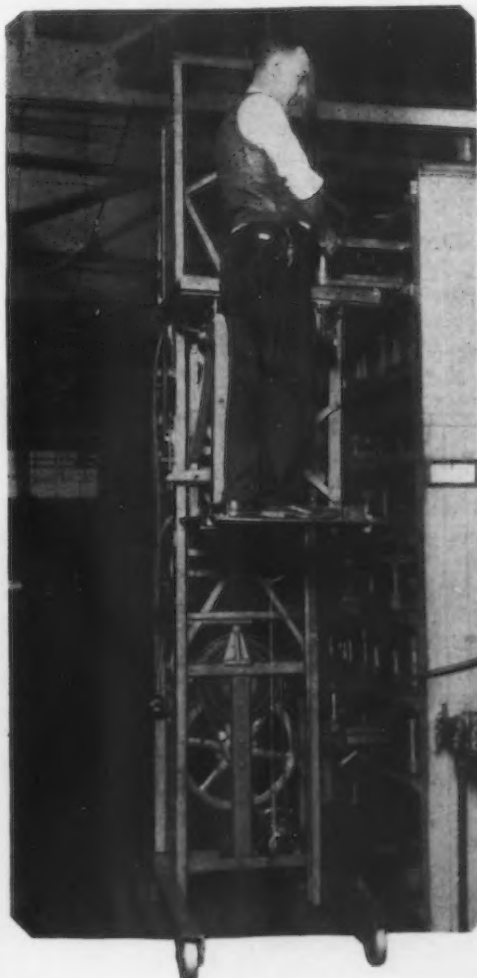
While the central station overhead conveyor operators are employed by the department and are under its supervision, they function entirely apart from the remainder of the department. In certain departments where roller and belt conveyors can be used advantageously the system, which for economy of space is built overhead wherever possible, ramifies from a central overhead transfer station with a single operator in charge. This operator routes the incoming tote boxes to the proper place in the department and dispatches all

outgoing boxes to the department to which they are assigned. Thus, the work of the operator is of an inter-departmental nature and consequently falls under the activities of the transportation department.

Closely connected departments have been linked by means of roller and belt conveyors. But a large quantity of material that cannot be handled by conveyors is transported between departments on electric lift trucks and trailers. The company's 23 buildings are connected by a series of tunnels, which are constantly utilized by the truck operators for hauling goods, and which serve also to carry steam and water piping, electric circuits, etc.

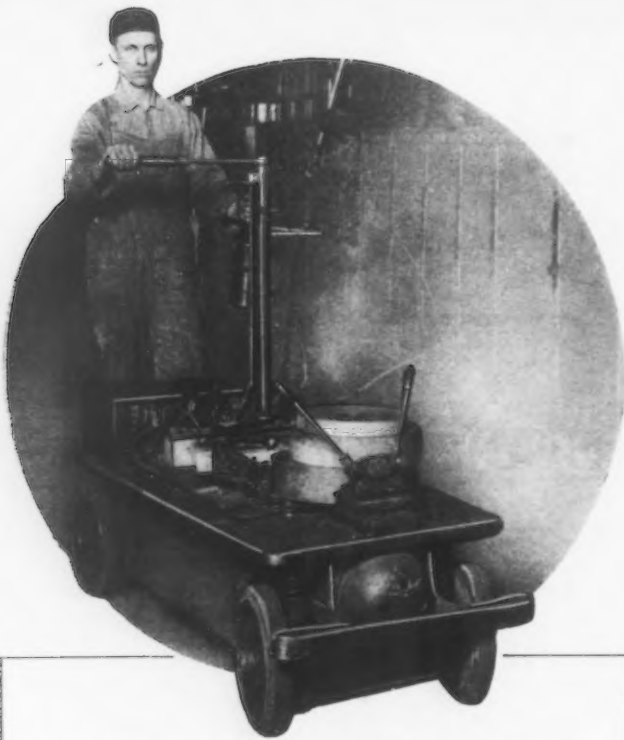
### Routine Parcel Deliveries

In a large plant having many departments the matter of rush deliveries of correspondence and packages from one department to another is important. A speedy parcel-post service is maintained for this purpose. The entire plant is divided into three zones, and three trucks are kept in constant use from seven o'clock in the morning until five in the afternoon. A system has been worked out whereby each truck starts at a given point and progresses through the factory, stopping every 45 minutes at a centrally-located transfer station to pick up parcels destined for departments to be covered during the next three-quarters of an hour. This arrangement permits four round-trips a day for each truck, and a delivery service to all departments at regular intervals of 45 min. throughout the day. Naturally, this service does not include



**D**IES Stored on Shelves Higher Than 6 ft. in Punch Press Department Are Removed by a Swifter-Lifter Portable Elevator

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**I**DLLE Machine Time Is Reduced by Having Millwright Repair Man Make Emergency Trips on Electric Truck, Carrying Tools with Him

the transportation of bulky or unusually heavy materials, but is confined to small packages and correspondence.

At the parcel-post transfer station in the basement of one building is a large drawer designated for each department. Parcels consigned to that department are deposited there by the truck operator, who has picked them up en route, unless that department happens to be in his next delivery zone. For instance, truck No. 1 may get in the rate department a parcel assigned to the heat-treating department. Since this truck will not get to the heat-treating department for possibly 2 hr. the operator, when he reaches the transfer station, puts the parcel in the box marked for the heat-treating department. It is then picked up by the operator of truck No. 2, who, during the next 45-min. period, will be covering the territory in zone 1, in which the heat-treating department is located.

Wherever practicable, trucks are assigned to specific jobs, which they perform as a matter of daily routine. One truck, for example, is kept busy transporting finished registers from the assembly department to the final inspection department. This truck is operated with four or five trailers loaded with registers. It is necessary to protect registers en route so that their finish is in nowise marred, and yet to transport them in sufficient quantities to insure low haulage expense. The management has found that movement by electric trucks and trailers is the most satisfactory method.

Other trucks are engaged in what might be termed "single-purpose" work. One electric truck with a series of trailers supplies empty tote boxes to starting departments, or departments in which orders begin their journey through the plant. This function may take the truck to all parts of the factory, in picking up empty tote boxes. In the traffic department an electric truck with trailers takes registers from the end of the conveyor rolls in the packing department to the warehouse, to await shipment to customers. Another truck delivers laundry supplies from the company's laundry to the various departments.

All lumber is taken from the dry kiln to the planing mill by electric trucks and trailers. Incidentally, this

truck and its trailers does the work formerly requiring the services of 12 men. Large rolls of paper destined for the company's printing department, and other paper supplies, are transported by an electric lift truck.

#### Tools, Millwrights, Electricians, Carried on Trucks

In a plant occupying 23 buildings the matter of expediting the delivery of tools from the tool room to the machining departments is of importance, because delays often retard production, with considerable loss in time as a result. The plan followed at the National Cash Register Co. is to assign one electric truck to this task. Trips are made to all departments on a two-hour schedule, starting at eight and ten o'clock in the morning and at two and four in the afternoon.

One of the most expensive delays in any manufacturing establishment is the time lost by a machine or other production unit down for repairs. The major item to be considered is not the lost time of the operator, but the number of manufacturing minutes or hours that a machine is idle. The company has cut such idle time to a minimum by providing the millwright repair man and the electrical repair man each with an electric truck. When an emergency call comes in, the repair man responds by going immediately on his electric truck to the place where he is needed, carrying with him his tools and any materials required for the job.

One of the products of the company is a cash register equipped with a floor cabinet which is so heavy that it cannot be lifted by hand. As mechanical means must be used for this purpose, a special hand-lift truck known as a chariot has been designed. One of the four metal sides of this truck can be lowered to the floor level, to allow the cabinet to be moved on and off with the least effort. When the truck is loaded or is idle, this side is raised in place and hooked to the handle.

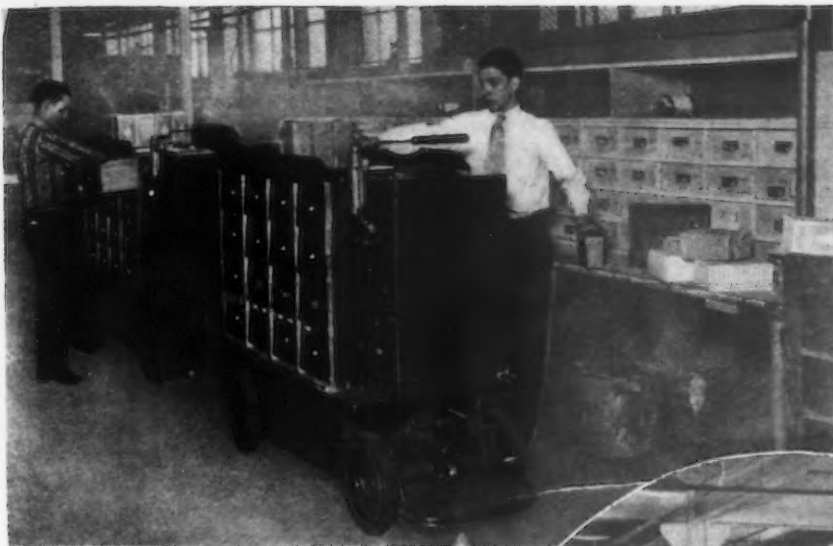
One electric truck has been assigned for the use of the night men who clean the factory in preparation for the next day's work. In this case the value of the truck lies in the facility with which supplies can be transported to all departments.

#### Handling Heavy Dies and Bolsters

In addition to the inter-departmental activities of the transportation department, it is responsible for the main-



**S**TATION in Basement, Showing Truck Operator Picking Up Emergency Orders for Special Service Outside Routine Calls



"PARCEL Post" Station in Basement (at Left). Operators getting parcels and letters for next trip. They are so arranged that the load may be disposed of in proper sequence, without rehandling

**F**INISHED Registers (in Circle) Being Transported on Electric Trucks and Trailers from Final Assembly to Final Inspection

**E**LECTRICAL Repair Man (Lower Right) Travels by Electric Truck, Equipped with Necessary Supplies. Ladder on truck enables him to repair electric lights with ease, while the capacity of his truck suffices for all ordinary routine calls



tenance of the electric trucks in the punch press department. In fact, the production system in that department is dependent upon the efficient handling of materials by electric truck. When a punch press operator is ready to start a new job, he commandeers the services of a "hy-lift" electric truck, the capacity of which is 4000 lb. The two workmen go to the stock bins in which the large dies for the punch presses are stored.

If the die is on a shelf more than 6 ft. above the floor level, it is removed by a "swifter-lifter" portable elevator, the capacity of which is 700 lb. to a height of 11 ft. This truck has a platform for the operator which is raised and lowered by an electric motor in conjunction with the movement of the platform for materials. This arrangement makes it possible for the truck operator to take the die from the shelf and put it on the truck platform, from which it is transferred to the lift truck. At the end of the row of stock bins is a transfer table on which the swifter-lifter elevator deposits the dies, which are taken out of bins in advance of the request for their use.

Before returning to the punch press, the two workmen and the truck stop nearby, where the bolster plates are stored and get the proper bolster plate for the job in hand. The truck then carries the die and the bolster plate to the punch press. Here the truck is run sufficiently close to the press so that the die and the bolster plate can be moved on to the press with a minimum of effort on the part of the machine operator.

While, so far as possible, definite assignment of electric trucks for inter-departmental transportation has been made, necessarily there are numerous emergencies when the services of a truck are needed on short notice. On such occasions the transportation department, notified by telephone, dispatches a truck which is kept on hand for emergency calls. If the truck is in use and therefore is not immediately available, a small card is filled out, stating the material which is to be moved, the depart-





ment in which it originates and the department to which it is to be carried. These cards are taken at short intervals by a member of the transportation department to one of two stations centrally-located in the basement. Each station has a board on which each truck operator has a hook. The notice of the emergency call is put on the hook of the operator whose schedule is best adapted to take care of that particular job.

Emergency assignments can be made in this way, because certain trucks are not engaged in a daily routine which consumes all of their working hours. Their regular duties generally are so distributed throughout the day that they can handle extra assignments, without interfering seriously with their normal activities. As the route they cover takes them past the stations frequently, they can pick up special orders.

Electric trucks are recharged every night in a special charging room. They are recharged automatically in a series of five. When the meter on any truck has reached the point which shows the battery fully charged, the circuit to that battery is automatically thrown out, but without interfering with the charging of the batteries of the other trucks in the same series. Truck operators are given 5 min. before closing time in the afternoon to take their trucks to the charging room and to couple them ready to be charged.

The plant of the National Cash Register Co. has large railroad switching facilities. In addition to bringing in raw materials and shipping finished cash registers, railroad freight cars are used for transporting metal frames from the punch press department to the assembly department, which are a considerable distance apart. The frames are placed on hand-lift trucks, which are moved into the railroad cars and are carried to the assembly department. The empty trucks then are returned to the punch press department.

Railroad cars are switched by means of a fireless switch locomotive operating on "live" steam. The boiler of the locomotive is connected by a pipe line to the boiler of the power house and receives a charge of "live" steam and hot water. This charge enables the locomotive to operate for about 3 hr. The company has three locomotives, one of which is in operation while the second is being charged and the third is in the shops for repairs or for maintenance work.

Switching schedules are set so that practically no time is lost in changing locomotives. Switching is handled by a crew consisting of an engineer, two switchmen and a yardmaster. The use of "live" steam does away with dirt and smoke—a nuisance objectionable to people living in the neighborhood in which the plant is located. It also helps substantially in maintaining a cleanly condition in and about the plant itself. Furthermore, its cost is slight. The division of activities at the National Cash Register Co. does not bring the switching operations under the di-

rection of the transportation department; nevertheless they are an essential part of the hauling system.

So far as materials are concerned, the company's plant may well be termed a factory on wheels. Wherever a workman is found unnecessarily engaged in handling parts by hand, an investigation is made and, if practicable, mechanical facilities are placed at his disposal. In adhering consistently to this practice the company is going on the theory that a skilled workman should be devoting every minute of his working time to activities which command the use of his experience and his skill, rather than to those which call for mere physical strength.

Truck transportation frequently requires the use of as many as four or five trailers. To make handling facilities as flexible as possible, all trailers have been equipped with coupling devices by which they can be connected to an electric truck or to other trailers. This device, which was designed by the company, enables a long string of trailers to turn corners without moving outside the line taken by the electric truck.

With numerous intersecting aisles, passageways and tunnels, and with trucks operating at a comparatively high speed, precautionary measures have been taken to insure the safety of operators and of other employees. A book of general trucking instructions has been put into the hands of every employee of the transportation department, and the motto is "the safe course is the best." Among the rules to which truck operators pledge observance are the following:

1. All operators must thoroughly familiarize themselves with all the dangerous places throughout the factory.
2. Each operator is to exercise the utmost caution to avoid injury to himself, fellow-employee or company property.
3. No person other than the operators and helpers are to ride on trucks or attempt to operate them, unless he has permission from the foreman of the transportation department.
4. Operators should not lounge on their trucks while they are in motion nor turn around to look in the opposite direction, but should stand erect, facing the direction in which they are traveling, and be on the alert, ready for any emergency.
5. Horns to be sounded at frequent intervals. Special care is to be exercised at intersecting aisles, tunnels, and when going through doors.
6. A motor truck should not be loaded so as to be dangerous or retard traffic. The height of the load should not be such as to prevent the operator from having a clear view in either direction.
7. To secure prompt elevator service motor trucks will be given right-of-way by giving the elevator bell two rings.
8. Motor truck operators when entering a tunnel should be sure that the signal light is burning, showing that a



LARGE Dies and Bolster Plates Are Handled in Punch Press Department by the Use of a Stuebing-Cowan Electric Lift Truck



motor truck is in the tunnel, and be sure to turn it off when leaving.

9. Do not enter tunnels if signal light shows motor truck in tunnel.

10. Speeding is prohibited.

11. It is the duty of each department in the factory to get its output daily on time, and to put forth every effort to gain that end. The employees of the transportation department should feel that it is their duty to serve the

different departments in the best possible way, in assisting them to accomplish this purpose.

12. A motor truck should not follow another closer than 50 ft., especially when going through tunnels.

13. A motor truck should not haul more than five trailer trucks at one time, without permission.

14. Motor trucks should be kept clean, to conform to the company's standards. Each operator will be held responsible for the oiling, greasing and cleaning of his truck.

## German Rolling Mill Practice

### Conservation of Heat a Primary Consideration—Special Method of Rolling Metal Railroad Ties

**M**OST of the soaking pits in larger German steel mills are operated without gas, according to a report by F. L. Estep of Perin & Marshall, New York, in a paper read before the Association of Iron and Steel Electrical Engineers at Pittsburgh, from which what follows is taken. The older blooming mill in the August Thyssen Huette plant at Hamborn, now part of the German Steel Corporation, is served with 84 soaking pits, of which only 20 are provided with gas for heating. The statement is made that soft steel is soaked only in the unheated pits and that rail steel and other special steels, after remaining 2 hr. in an unheated pit, are transferred for  $\frac{1}{2}$  hr. into a heated pit to be prepared for rolling.

The new (1928) blooming mill, the same size as the other, has 100 soaking pits, of which 60 are unheated. The increase in the percentage of heated pits is based on expectation of rolling a larger amount of rail steel and on the fact that, in many cases, better rolling results are obtained by additional heating than by letting the ingot soak without gas.

Both blooming mills are two-high reversing, with rolls 46½ in. in diameter and pinions of 52 in. They roll ingots of about 4½ tons into billets, rails, railroad ties, structural shapes and other products. The total capacity of the plant is about 2,100,000 tons of ingots, of which 70 to 80 per cent is made by the Thomas (basic Bessemer) process and the remainder in open-hearth furnaces.

There are five converters, which originally were of 30 tons each. One has been increased to 42 tons capacity and the other four are to be changed over to 45 tons, which amount will be blown at each heat.

#### Saving the Initial Heat in the Steel

When the converter is poured, the metal is taken to an ingot pouring stand and the ingot is stripped almost immediately after being teemed. It is then conveyed quickly into the soaking pit building, which has single-hole pits served with a low crane. There is a rotating device on the crane, with four arms, one of which picks up the ingot and deposits it in the pit.

It was said that not over 21 min. elapses from the time the 30-ton converter pours its metal into the ladle until the last ingot of that heat is in the soaking pit. This conserves fuel by preventing the ingots from losing their heat to the molds and thence to the atmosphere. This method of working is possible only with Thomas steel, where a small number of ingots is handled at a time. It cannot be done with open-hearth products, where the ingots have to be carried first from the pouring platform to the stripper and then to the soaking pits.

Fuel used in the soaking pits is reported as only 3.6 per cent (coal equivalent) to the weight of the ingot. This would mean about 81 lb. of coal for a gross ton of

ingots. It must be remembered in this connection, however, that only 40 per cent or less of the steel is heated at all. There have been times, with the plant running practically without open-hearth steel, when the fuel consumption ran as low as 2.1 per cent.

Capacity of these blooming mills is placed at 3300 tons of ingots in 24 hr. This means about 30 ingots every hour and points to a very high sustained efficiency of operation.

#### Rolling Steel Ties

Steel ties are made with the initial ingot heat. Nineteen passes for a 4½-ton ingot in the blooming mill convert it into a slab. This is cropped and then taken to a 37½-in. mill, where it is finished in nine passes, from the original heat. It then is sawed in two and started in two parallel streams on a divided roller run. Each stream goes to a shear which cuts the pieces off in lengths and each feeds a press. Each press completes the ties at the rate of 15 a minute. The pieces passing out of the press go immediately through the oil tempering bath, coming up under a series of spray pipes to be cooled.

On this basis of converting an ingot into a finished metal tie, together with the celerity with which the ingots are put into the soaking pits and thence into the mill, it is possible to ship a carload of ties in less than six hours after the converter heat of which they are made is poured from the vessel.

Similar metal ties made in England are rolled flat on a mill and then sheared into lengths. These sheared pieces are reheated in a furnace and given one operation in a press. They are then again reheated and given a finishing operation in a second press. From the ingot to the finished piece there probably were four heats.

### Water Line Made of Flat Ingot Iron Sheets in Southern Utah

Construction of a 10-in. 6½-mile pipe line through very rough country in southern Utah is described by C. J. Ullrich in *Engineering News-Record* for March 21. No. 12-gage ingot iron was shipped flat to the nearest railroad station, and there fabricated into sections six feet long by automatic arc welding. Four of these sections were then butt-welded together by the oxy-acetylene process, tested at 300 lb., and coated with asphalt. The line passed over such rough country that nearly every one of the 1430 field joints had to be cut to an angle, and 237 lengths were cut in half and rewelded at an angle. All field cutting and welding was done with gas. Expansion joints were placed at 500 to 1000-ft. intervals. Not a single leak was found when the water was turned on.

# Medium-Manganese Rail a Success

230,000 Tons Now in Track—Records Show Low Rate of  
Wear, Head Breakage and Transverse Fissures—  
No Difficulties Experienced at Mills

BY E. E. THUM

**I**N 1928, 114,250 gross tons of intermediate-manganese rails were bought and placed in main-line track by four prominent American railroad companies. These rails contain less carbon than the conventional analysis, and so much more manganese that they may be classed as alloy steel (yet not nearly enough to bring them into the class of Hadfield's austenitic manganese steel, used to a certain extent in sharp curves, and sometimes called Menard rail).

In 1923 none of this medium-manganese rail was rolled. Such a rapid growth in popularity warrants an explanation of its origin and the advantages found by service records.

## Bessemer Rails Gave Superior Service

Within recent years railroad engineers have been disturbed about the inordinate number of failures in the rails rolled since 1900. Data collected by the American Railway Engineering Association showed, for instance, that after rails rolled in 1908 had borne traffic five years, no less than 398 of them in each 100 miles of track had broken; 310 rails rolled during that year have also developed the most feared defect, known as transverse fissures, in the intervening years up to and including 1927.

Citing a specific road's experience, the rails delivered to

the Delaware, Lackawanna & Western Railroad Co. from 1909 to 1915 performed so much worse than those bought during the 1890's that the chief engineer, G. J. Ray, endeavored to find the real reason for the difference in quality. The older rails giving so much satisfaction were rolled of Bessemer steel in the plant of the Lackawanna Iron & Coal Co., located at Scranton, Pa. (now dismantled). Figure 1 is a characteristic profile of these 80-lb. rails after 30 years of service. This particular rail was rolled in 1893, and remained in main-line track about 20 years; it was then placed in second track and removed in 1923 only because it was wanted for study. It had carried 170,750,000 gross tons of traffic, and had worn down 0.43 sq. in. in section, or 0.0025 sq. in. per million tons of traffic. Much of this old 80-lb. Bessemer rail is still in service (1929), and has carried upward of 250 million tons of traffic, including locomotive wheel loads now thought more suitable for a 130-lb. section of open-hearth steel.

While rail records were not so carefully kept and classified in 1893 as they are in 1929, a failure in these Scranton rails from a broken or split head was so rare as to excite comment. Transverse fissures were practically non-existent. In fact, the cumulative totals to Jan. 31, 1928, from all railroads reporting to the American Rail-

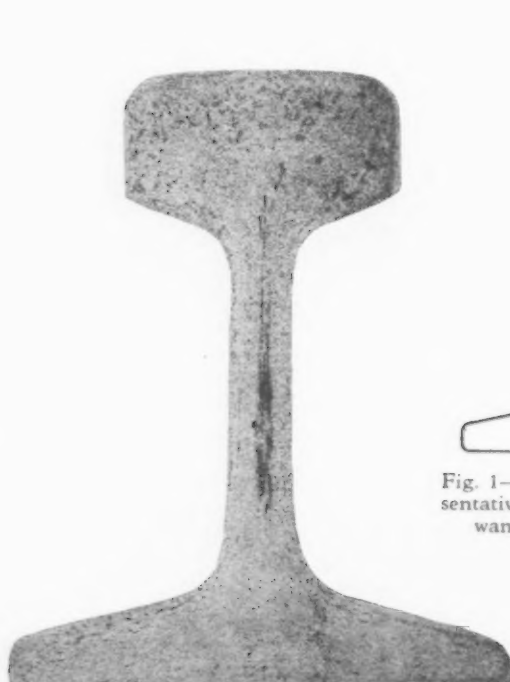


Fig. 2—Typical Sulphur Print of 125-lb. Standard Open-Hearth Rail Rolled Under New York Central Specifications. Segregation not sufficient to influence chemical analysis of drillings, but black specks shown near wheel tread are undesirable



Fig. 1—Profile of 80-lb. Bessemer Rail. Representative of 1890 to 1895 Rollings at Lackawanna Iron & Coal Co., Scranton Mill



Fig. 3—Typical Sulphur Print of 105-lb. Rail Rolled Under Medium Manganese Specification. Light area at top of web indicates traces of piped condition. Figures 2 and 3 are by courtesy of C. B. Bronson, Inspection Department, New York Central Lines

way Engineering Association show that rails made at Lackawanna's Scranton mill during the early '90's were practically immune from that defect. Records follow:

Date of Rolling Lackawanna (Scranton) Mill	Total Transverse Fissures to Jan. 31, 1928, From All Railroads
1889	None
1890	2
1891	4
1892	None
1893	None
1894	None
1895	1
1896	4

A considerable number of these unusual rails were removed from the track by Mr. Ray, given various tests, both physical and chemical, and the results compared with more recent and far less satisfactory open-hearth metal. The most obvious difference was found in the chemical analysis, as shown below:

	80-Lb. Bessemer Rail, 1890-1895	100-Lb. Open-Hearth Rail, 1909-1915
Carbon .....	0.45 to 0.50	0.70 to 0.83
Manganese .....	1.40 to 1.60	0.60 to 1.00
Copper .....	Up to 0.60	None

The copper came in from copper-bearing ores mined at Cornwall (Pa.), but since the copper content ranged from a few points up to 0.50, or in an extreme case 0.60, it was thought that such a variable quantity could hardly be responsible for uniformly high quality. Consequently, as a first approximation, the unique hardness and toughness (i. e., low wear and few breakages) were ascribed to the interaction of low carbon and high manganese.

Little opportunity afforded to pursue this matter during wartime, but this supporting fact was noted: Since ferromanganese was then scarce, steel mills economized by delivering rails with manganese toward the low side of the specification, a practice which immediately and sharply increased the number of failures in the rails rolled during 1915, 1916 and 1917. Evidently it was not well to reduce manganese even in rails with high carbon, intended to give sufficient hardness. Study of records accumulated by the New York Central Railroad also showed that old heats having relatively low carbon and manganese as high as 1.30 per cent performed satisfactorily in track.

Some evidence was not so favorable: One heat was accepted in 1911 by the Lackawanna Railroad containing 0.56 per cent carbon and 1.21 per cent manganese, but its durability was not unusually good. Furthermore, one heat accepted by the same company in July, 1920, containing 0.64 carbon and 1.34 manganese, and another heat with 0.57 carbon and 1.34 manganese, respectively, did not give a very good account of themselves in the routine acceptance tests (and later developed some transverse fissures). Lastly, records of 100-lb. open-hearth rails showed that, when the carbon was toward the upper limit, the rail was brittle even though the manganese was up to 1 per cent.

#### First Rollings at Steelton

Balancing all these factors, Mr. Ray decided that a rail with 0.60 carbon and 1.30 to 1.40 manganese would have better chemistry than the usual specification, and presented his conclusions and reasons on Sept. 14, 1920, to a joint meeting of the rail committee of the American Railway Engineering Association and the steel manufacturers' representatives. None of the latter would believe that such a rail could be rolled commercially nor would be anything but a failure in track. The then general understanding about manganese has been recorded by William H. Sellev in his book on "Steel Rails" (1913) as follows: "Manganese has a general tendency to increase the tensile strength and reduce the ductility." An article on "High-Strength Structural Steels," published in THE IRON AGE, March 21, indicates how manganese got into the rail specification riding on the coat tails of carbon, so to

\*Except for curved track, where 10 per cent less wear is noted on the high side of  $4\frac{1}{2}$  to 6 deg. curves.

speak, and despite the tradition that it is an embrittling alloy. (As a matter of fact, subsequent experience in many uses has amply proved that manganese is an embrittling element only when carbon is high; as the former goes up the latter should come down; with correct adjustment of the two, strength is maintained, true elastic limit is raised and stabilized, and the impact strength of notched bars greatly improved.)

After some negotiation, the Bethlehem Steel Co. agreed to make 2000 tons of rails of the new analysis. They were made at Steelton, Pa., closely observed by both steel and railroad company officials. These rollings produced excellent rails in every respect, not only as judged by the inspector, but from performance records in track. More recent purchases by the Lackawanna Railroad have been:

	Gross Tons		Gross Tons
1924.....	287	1927.....	20,749
1925.....	14,299	1928.....	20,000
1926.....	15,827	1929.....	18,500

All the rails bought by this company are now within the following chemical limits:

Section	Carbon	Manganese
105 and 118 lb.	0.54 to 0.67	1.20 to 1.50
130 lb.	0.57 to 0.70	1.20 to 1.50

Information about the 1920 rollings was available to other railroads through the activities of the committee on rail of the American Railway Engineering Association. By 1925 the New York Central Lines decided to give them a trial; while conclusive data on wear have not been collected\* by them, the medium-manganese rails have been so satisfactory that the tonnage purchased is steadily growing:

	Gross Tons
1925.....	300
1926.....	9,000
1927.....	25,000
1928.....	48,950
1929.....	65,390
Total .....	148,640

The 1929 purchases represent about one-third of the total requirements of the New York Central. Chemical specifications for all 105, 115 and 127-lb. sections are: carbon 0.54 to 0.67 and manganese 1.30 to 1.60 (note that the latter is somewhat higher than the Lackawanna specification).

In 1926 the Chicago, Burlington & Quincy Railroad Co. was sufficiently impressed by the news about these rails to purchase 3000 tons of them. Subsequent purchases have increased until by the end of 1928 this road had a total of 58,700 gross tons in track. The Atchison, Topeka & Santa Fe Railway Co. also purchased 13,000 tons in 1927 and 1928. These two roads use 90 and 110-lb. sections; the chemical limits are 0.50 to 0.65 carbon and 1.30 to 1.60 manganese. Several thousand tons have also been bought by Canadian National Railways. In all, therefore, about 230,000 gross tons of heavy-section rails of this new analysis have been bought and placed in track up to Jan. 1, 1929. Three other roads have bought experimental tonnages, as shown in the following table:

Road	Tonnage	Section	Carbon	Manganese
Northern Pacific....	1705	100, 130	0.50—0.70	1.30—1.60
Pennsylvania .....	942	130	0.55—0.70	1.40—1.70
Reading .....	300	130		

#### No Rolling Mill Troubles Encountered

No unusual metallurgical or rolling mill difficulties have been observed in four mills rolling rails for the New York Central Lines. Once the mill superintendent decided that some more medium-manganese steel would be needed to finish an order; he telephoned the open-hearth superintendent, and the latter selected a heat destined for the standard specification but about 30 minutes from the finish. The amount of recarburizer, ferromanganese and ferrosilicon was figured from the laboratory return to give the 0.60 per cent carbon, 1.45 manganese,



0.20 silicon composition, rather than 0.67 carbon, 0.85 manganese and 0.20 silicon which otherwise would have been made.

The same but no greater precautions are enforced in ingot practice, preheating and rolling. The metal sets quieter in the mold, due to its high content in manganese and silicon (no aluminum is allowed), and pipes somewhat deeper. This accounts for almost double the number of rejects due to pipe. Test records show 2.0 per cent piped rails in approximately 135,000 tons accepted, and 1.2 per cent for a comparative tonnage of carbon steel.

This extra discard from pipe is more than counterbalanced by a smaller number of seconds, and especially by a higher quality of uniform metal. Figures 2 and 3 show characteristic sulphur prints of standard open-hearth and medium-manganese rails, respectively. The segregates in the former are so small in volume that a chemical analysis of drillings taken from the middle and the outside of the head does not indicate the relative uniformity as well as the sulphur print. Still chemical analyses in "O and M" positions on 210 heats of carbon rails gave carbon segregation of 8.3 per cent; 597 heats of medium-manganese rails gave carbon segregation of 5.1 per cent (both weighted averages).

As was demonstrated by John B. Emerson in 1920, broken rails are more apt to occur in segregated than in piped metal. Consequently the homogeneity indicated by Fig. 3 will be expected to give better service records, despite the probability that occasionally a concealed pipe will escape mill inspectors. Most engineers now agree that a quiet setting, piping, non-segregating steel is more desirable for rails than one which slightly effervesces in the mold and has less pipe but a more pronounced degree of segregation. Increased silicon in recent specifications makes for quiet steel; a further step in the same direction is evidently taken by extra manganese.

#### Medium-Manganese Makes More First-Quality Rails

It was mentioned above that larger losses from pipe were more than counterbalanced by an increased yield in first-quality rails. Furthermore, there are fewer "border-line" defects which cause an inspector to doubt; if a medium-manganese rail has any surface defects they are of a nature which classifies it immediately as a second. Comparative figures follow:

Road	Medium Manganese		Standard Open-Hearth	
	Approximate Tonnage	Per Cent Seconds	Approximate Tonnage	Per Cent Seconds
C. B. & Q.....	58,700	4.73	67,000	5.44
D. L. & W.....	22,777	3.0	6,754	6.5
New York Central..		11.2		17.2

On the average, the medium-manganese rail produces about two-thirds the usual number of seconds.

#### Comparative Records in Track

A great deal of data on performance of medium-manganese rails was collected by the committee on rail, American Railway Engineering Association, and presented to the March, 1929, meeting held in Chicago. The Lackawanna Railroad reported definite figures for wear under heavy traffic, the averages being:

Medium Manganese:	Wear, per Million Tons
Tangent track .....	0.0018 sq. in.
4 to 7 deg. curves.....	0.0057 sq. in.
Standard Open-Hearth:	
Tangent track.....	0.0045 sq. in.
1½ to 7 deg. curves.....	0.0073 sq. in.

Data on failures from split and mashed heads were also collected by the committee. The Pennsylvania Railroad Co., with an experimental lot of 942 tons, reports an extremely high rate of failure, but in the engineer's opinion this "is due in all probability to two heats which were high in manganese and at upper limit in carbon." The Reading Co., with an experimental lot of 300 tons, had

very few failures, but the rails were too low in carbon, and flowed so much under 35 million tons of traffic that they were all removed from the track within two years.

Excluding these experimental rollings, the Lackawanna, Santa Fe, New York Central and Northern Pacific railroads report 96 failures from 171,430 gross tons of rail laid since 1925. A similar tonnage of standard rails installed in track at the same dates would have been expected to develop approximately 230 failures by this time (as computed from American Railway Engineering Association averages). These figures may be somewhat misleading, since the data collected for medium-manganese rails cover head failures only, whereas the data on standard rails include failures in web and base. But the advantage is with the former, as is indicated by data from the Lackawanna Railroad, viz., in 2625 tons of 118-lb. medium-manganese rails rolled in January, 1925, no split or crushed heads have occurred; in 8870 tons of 118-lb. standard open-hearth rails rolled in November, 1924, 58 head failures have developed.

Records for transverse fissures are also excellent. Up to the date of the rail committee's report, one transverse fissure was reported by the Reading after one year's service in curved track under heavy traffic. New York Central Lines East reports five, all in rails rolled in one mill during 1925 and 1926. (Extensive improvements have since been made at this rail mill.) Compare this record of six fissures in 170,000 tons of rails to an expected 14, as computed from the average performance of an equivalent amount of carbon steel rails.

The first transverse fissure occurred in Lackawanna track early in 1929. This rail has been carefully studied, and has excellent structure, strength, toughness, and freedom from inclusions. According to G. J. Ray, chief engineer, the medium-manganese rail is not expected to be immune from these detailed fractures starting from internal nuclei, but their development will be considerably retarded by the greater toughness and higher true elastic limit.\*

It is therefore apparent that records on wear, head failures, and transverse fissures all indicate that measurable superiority of the medium-manganese rail foreshadowed by its superior structure.

#### Physical Properties of Medium-Manganese Steel

A number of other physical tests are noted in the A. R. E. A. committee's report. Deflection after the first blow of the drop hammer is slightly less in medium-manganese steel, and the average number of blows to break seems to be slightly greater. Hardness by ball indentation is a little greater, but the results cannot be translated into Brinell numbers. The Santa Fe Railroad reports 114 Izod impact tests on medium-manganese steels which average 4.32 ft.-lb.; 15 test pieces on carbon steel average 2.19 ft.-lb. Average tensile properties reported by New York Central are:

	Medium Manganese	Plain Carbon
Ultimate strength.....	122,000 to 138,000	111,000 to 128,000
Yield point.....	68,000 to 87,000	55,000 to 66,000
Elongation .....	15 to 10	12 to 10
Reduction in area.....	32 to 17	20 to 12

While these acceptance and laboratory tests are not systematic enough to warrant quantitative comparisons, the uniform indication is that the medium-manganese rail has a shade the better of standard carbon steel.

#### Conclusion

The net result of these experiences is to indicate that the standard open-hearth carbon steel rail can be measurably improved by lowering the carbon to 0.55 to 0.70 and increasing the manganese to 1.25 to 1.50. Carbon and manganese both on the high side will be suspicious and probably brittle; both on the low side will give a rail which will probably flow under traffic. With the two elements properly balanced, a long-wearing, tough and generally satisfactory product is secured by usual good rail mill practice.

\*See THE IRON AGE, March 21, page 799.

# Heat Treating Ball Bearing Parts

## Furnaces with Gas Heat and Automatic Control of Speed of Operation—Two Types of Bearings Developed

BY J. B. NEALEY\*

**S**PECIALIZATION and mass production on the part of one organization, which has pioneered in the manufacture of stamped and cold forged ball bearings, has been rewarded by the wide adoption of the two distinct classes of ball bearing that it has concentrated upon.

First of these is an unground ball bearing for use where reduction of friction at low cost is imperative. For such conditions, and where extreme accuracy is not required, it has developed single and double, non-adjustable radial types, combination radial and thrust types and thrust type ball bearings. In these five types of bearings, all parts which come in contact with the balls are carefully heat treated to obtain the requisite hardness.

The several operations through which these parts pass produce a smooth surface finish. By means of a soft steel band the components are assembled into a single unit. The soft steel band retains the lubricant and eliminates the necessity of machining with extreme accuracy the recess into which the bearing is fitted. A full quota of alloy steel balls is used in these types, assuring a maximum load-carrying capacity.

### For Heavy Loads and High Speeds

The second class—a line of grooved ball end-thrust type bearings—was developed for applications where heavy loads and high speeds are encountered and extreme accuracy is essential. The grooved type washer has the following advantages: (1) Maximum carrying capacity with a minimum of friction, due to contour of raceway, which is found slightly larger than the ball; (2) centering of retainer on the pitch diameter at the base of the groove, thus eliminating possible shaft cutting through oscillation of the retainer.

The diamond retainer is designed to provide: (1) Equi-

distant spacing of balls, which insures equal distribution of load; (2) reduction of contact surface to a minimum, with subsequent elimination of drag; (3) retention of lubricant; and (4) strength through the diamond channel construction.

Housed in a modern brick, steel and concrete building, the plant of the Nice Ball Bearing Co., Philadelphia, is divided into nine departments: automatic screw machine, press, grinding, machine shop, tool room, hardening, inspection, stores and engineering. While engineering was mentioned last, this department could well be placed first, for here refinements are created and bearings for new applications are developed.

### Making Thrust Bearing Washers

In the automatic screw machine department, which is equipped with 30 automatics, are made thrust bearing washers too large for the presses. The bar stock is placed in the machines, a hole drilled in part way and the washers cut off. These are put into automatic lathes, chamfered on all edges and the ball groove machined in. Special orders for bearings too small to warrant making up necessary dies, etc., are produced here, also.

Raw stock consists of bars, sheets and tubes; the balls are purchased. In the press department are 50 mechanically driven presses, the largest of which is rated at 1000 tons. Strip steel is fed from rolls automatically or by hand, according to the nature of the work. Washers, cones, races, bands and retainers are produced; the presses, with the aid of dies and jigs, will stamp out from one to six at a time.

Thrust washers are pierced and blanked in a single operation, and from one to six at a time, according to size and type. The inside and outside diameters are chamfered on one side and then on the other, after which the ball



Battery of Rotary Carburizing Furnaces, Fired with Gas, in Close Association with Their Row of Quench Tanks

groove is pressed in. Bands are cup shaped and are blanked and drawn in one operation, the center pierced and the edges trimmed. The cones are blanked and pierced in one operation and formed in another, both being done in one press by changing the dies.

Large retainers, made in two halves, are pierced and blanked in one operation and a channel is formed with ears in another. The piercing is for the balls and the two parts are sent to the assembly to receive these.

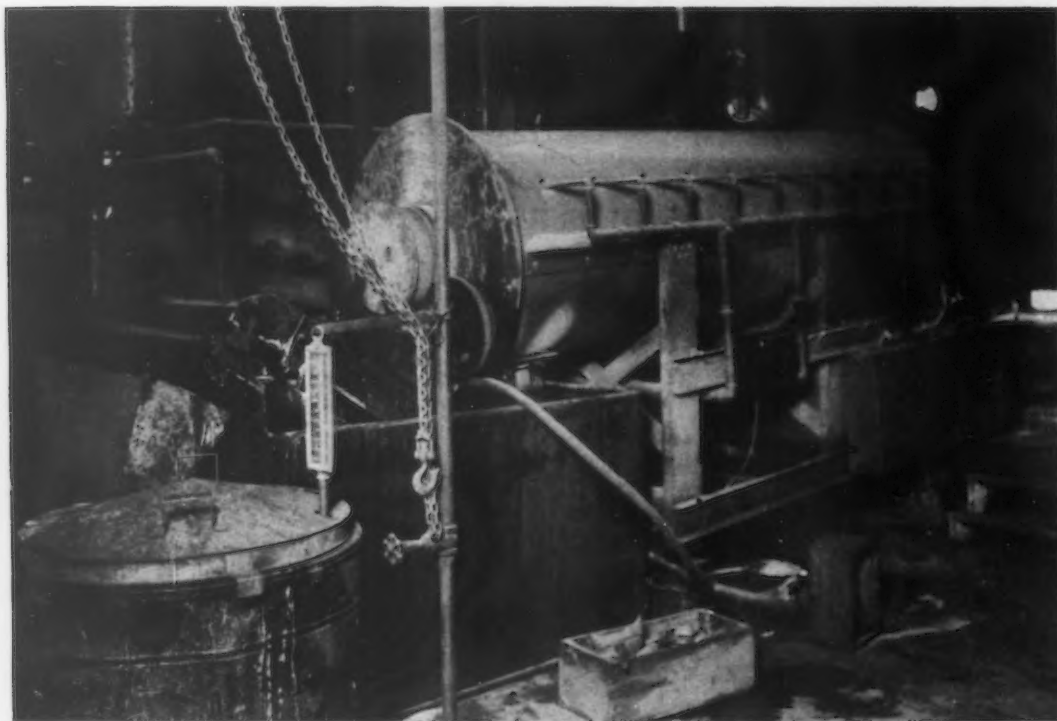
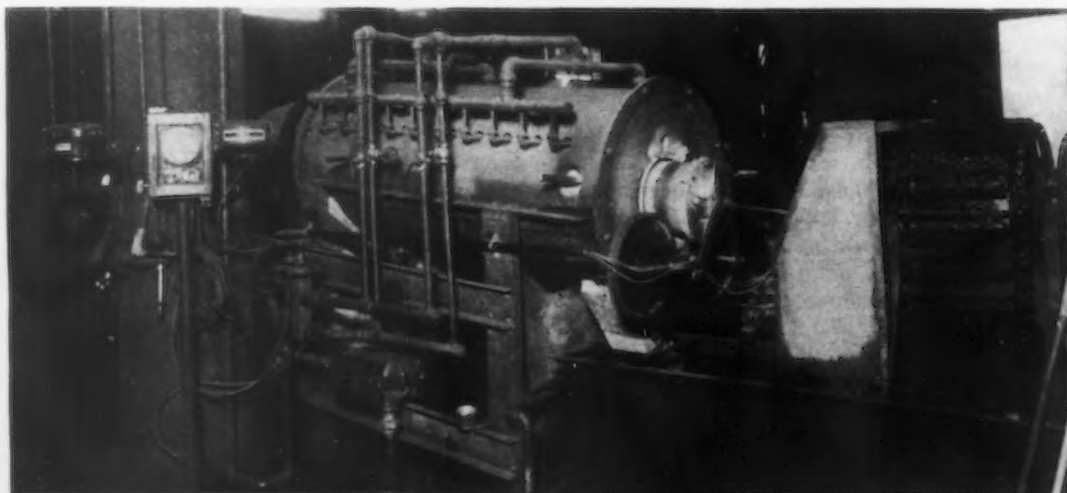
In the grinding department the races are faced on Blanchard grinding machines, automatically fed. Some of

parts are packed in nichrome pots and heated to 1650 deg. Fahr. in a time varying from 5 to 24 hr., to obtain cases from 1/32 to 3/16 in. deep.

When the time limit has been reached the work is cooled in the pots and boxes and then reheated in smaller furnaces. This time the temperature is from 1550 to 1600 deg. Fahr., and the heating period from 1½ to 2½ hr. The parts are then quenched in oil or water, according to the steel; alloy steels are oil quenched. After being sand blasted for scale the work is reheated for case refinement.

This reheat requires a temperature of 1390 to 1430 deg.

**R**OTARY Gas  
Fired Heat-  
Treating Machine  
or Furnace (be-  
low) Which Is  
Both Continuous  
and Automatic.  
The elevator  
shown removed  
the quenched parts  
from the quench  
tank in front of  
furnace



**M**ACHINE-  
Operated  
Furnace (above)  
for Heat Treating  
of Ball Races. It  
is under control of  
the pyrometric  
equipment shown,  
and delivers its  
product, through  
a chute, into the  
quench tank,  
whence, the chain  
device at right  
raises it

the washers are rough faced on both sides and finish faced on emery wheels, being held by magnetic chucks. The inside and outside diameters are ground in two different machines. There is a special set-up for grinding in the groove, in which the washer is held in a chuck movable about a radius. The washer is then turned about the radius of the groove as it is being ground in.

#### *Subjecting Bearing Parts to Heat Treatment*

**A** COMPLETE and up-to-date heat treating department is employed for case hardening and heat treating practically all the parts that go to make up the bearing. For carbonizing the larger parts a battery of box type furnaces 4 ft. square and 6 ft. deep is used. The

Fahr. and a heating period between 1½ and 2½ hr. The parts then are quenched in oil, brine or water; the alloy steel in oil or water and the carbon steel in brine. Drawing is accomplished in a salt bath at 350 deg. Fahr., the heating period varying from 1 to 2½ hr. Sandblasting is employed after every heating.

Carbonizing of the smaller parts is done in a battery of six rotary carbonizing machines with the quenches located in front, so that the work can be discharged directly into them. The work is charged into these furnaces with carbonizing material and heated to about 1650 deg. Fahr. for from 25 min. to 14 hr. before quenching.

They are then sandblasted and reheated in a continuous reheating furnace of the same type as the others, but



redesigned and adapted for this work. Inside the drum is a spiral retort which causes the work to progress forward, as it revolves, until it is automatically discharged into the quench at the farther end. The heating period depends upon the speed at which the retort revolves and this speed is regulated through speed-reduction gears.

#### Automatic Control of Speed and Temperature

Heating periods range from 20 to 30 min. The temperature, from 1400 to 1420 deg. Fahr., is automatically maintained by pyrometric control. These furnaces are all heated with gas fuel and equipped with recording pyrome-

ter. A thermocouple is placed in front and rear of each.

The quench tank into which the revolving reheat furnace discharges is provided with a revolving drum with a spiral which causes the work to progress through the quench at the right speed, for about 10 min. Then it passes into an elevator conveyor, is lifted over the side of the tank and discharged into wheelbarrows for further handling. A circular chute runs from the discharge end of this furnace into the liquid of the quench, thus sealing the work off from the oxidizing effects of the air. This automatic reheat furnace has a capacity for 300 lb. of work an hour.

## Rings for Checking Accuracy of Testing Machines

BY W. S. MOREHOUSE\*

TO an increasing extent metals are being purchased under specification for strength and ductility. If an honest disagreement arises between purchaser and manufacturer regarding the physical properties of a shipment of materials, the accuracy of the testing machines should first be suspected unless they are verified at periodic intervals. There is also another factor operating as the art of producing and manufacturing structural materials progresses; namely, the allowable variations in properties become narrower, and more accurate testing is therefore essential.

Dead weights are practicable for verifying only comparatively small testing machines. It is evident, for example, that calibrating a 100,000-lb. testing machine by weights is out of the question from a commercial point of view. Therefore, the readings of a testing machine are usually compared with the readings of a secondary standard which has been either directly or indirectly calibrated by dead weights. The errors of this secondary standard should be lower than the errors which can be allowed in routine testing. The latter figure is fixed by the American Society for Testing Materials (Standards, 1927, part I, page 802) at less than plus or minus one per cent for a new testing machine, and less than plus or minus 1½ per cent for a used machine. For some engineering purposes, such as for determining Young's modulus of elasticity, considerably greater accuracy is required.

The United States Bureau of Standards has given considerable attention to the question of commercial verification of testing machines, and H. L. Whittemore and S. N. Petrenko of the staff have designed and patented a simple apparatus for this purpose. Their proving instrument, as shown in the view being operated by Captain Petrenko, is a circular steel spring which can be subjected to tensile or compressive forces. The load bears a fixed relation to the deformation of the ring, and the latter is measured by a micrometer screw which is permanently attached inside the ring.

Readings of the micrometer screw are observed when the rounded end of the micrometer screw comes in contact with a vibrating device; contact is indicated by a buzzing sound when the vibrator is slightly deflected and then released. This method of measuring the deflection possesses remarkable sensitiveness. A displacement of micrometer screw of about 0.000005 in. is sufficient to produce a perceptible change of sound. For an instrument of 100,000-lb. capacity this change of deformation corresponds to a change of load of only 10 lb.

These proving instruments are extremely simple in design and rugged in construction. The rings are made from heat treated alloy steel, and weigh about three pounds for every 10,000-lb. capacity. A 100,000-lb. prov-

ing instrument weighs, therefore, approximately 35 lb.

A further advantage is that readings are not appreciably affected by slight eccentricity of loading, small changes of temperature, nor if the apparatus is disassembled for cleaning or adjustment.

The instruments are calibrated by dead weights at the Bureau of Standards and, if the instrument complies with the specifications for accuracy, a certificate is issued for it. This requires that the instrument must reproduce its



Whittemore-Petrenko Proving Instrument Verifying Reading of a Testing Machine Under Compression Load

readings within plus or minus 1/10 per cent at a load equal to the full capacity. While this is the specified accuracy, the real accuracy is usually twice as good, i. e., the instruments determine loads to within plus or minus 1/20 per cent of their capacity.

Under the title "Man's Conquest of the Air," Midwest Air Filters, Inc., Bradford, Pa., has published an attractive 24-page pamphlet dealing with dust elimination and the theory and application of the centrifugation principles. The connection is definitely drawn between the purely theoretical reasoning and the practical scientific accomplishment.

\*Morehouse Machine Co., York, Pa.

# Machine Tool Production in 1927

Census Bureau Figures Sub-Dividing Machines by Kinds  
and Showing the States Making the Chief  
Supply of Each

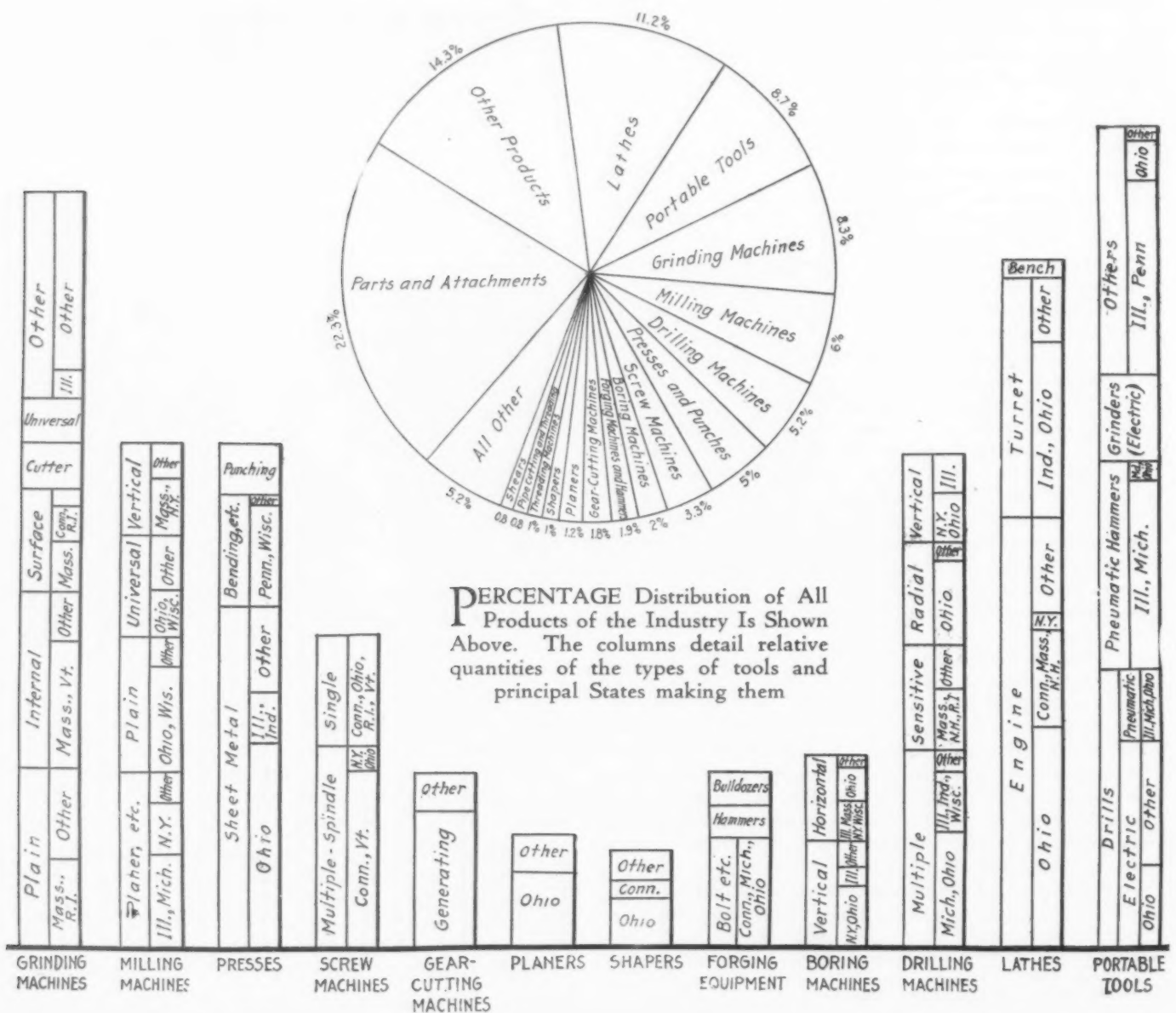
**P**RODUCTION of machine tools in 1927, in establishments devoted primarily to that work, is reported by the Bureau of the Census at \$136,745,605, which represents an increase of 13.9 per cent over the \$120,041,179 of 1925. The recent figure is double the \$67,729,363 of 1921. Other products made in the same establishments brought their total output for the year to \$159,513,125 in 1927. Wage earners averaged 35,269 and their wages amounted to \$52,365,692.

In the table will be found the production of the principal types of machine tools, with the figures for the leading States of production. This table shows all the States for which separate figures can be given without disclosing production of individual establishments. In some cases certain States shown in combination, and others for which

no figures are given even in combination, reported larger amounts than some of the States shown separately.

Two diagrams are shown, one of which depicts the percentage of the total product covered in the various leading items. The other shows the distribution of the principal items into their sub-classes, and in many instances shows the contributions of individual States or groups of States in those sub-classes.

Comparison of the output in 1927 with that of 1925 discloses some striking changes. There has been a large increase in production of grinding machines, with the exception of the plain cylindrical type. Multiple-spindle drilling machines have shown an increase of 55 per cent, partly offset by a reduction in the radial type. There has been a gain of 55 per cent in production of "other" lathes,



as distinguished from engine, turret and bench types. A similar gain has been made in planers.

Milling machines have shown a heavy increase, but pneumatic hammers have fallen off 43 per cent. Drop hammers have lost more than half the previous volume and bending machines have suffered almost equally. Punching machines have dropped more than half, as also have slot-  
ters. There has been a decline in screw machines, which is particularly notable in the multiple-spindle type, although the extent even there was little more than 16 per cent.

Increasing use of power was reported by the 355 establishments in the industry in 1927. The total was 150,331 hp. installed, or 4.3 hp., average, for each wage earner. This compares with 118,819 hp. in 1925, or 3.95 hp. for each wage earner, in the 329 establishments then active. Another change noted is a reduction of 5.8 per cent in the amount of contract work done during the year, the figures having been \$22,767,520 in 1927, against \$24,161,304 two years earlier. Value added by process of manufacture was \$113,398,276, in place of \$100,376,332 in 1925.

### Machine Tool Production in 1927, by Value and Quantity

	Number	Value		Number	Value		Number	Value
Total for United States .....		\$159,513,125	Ohio .....	95	156,698	Portable Tools—		
Bending Machines .....	438	368,643	Michigan, Penn- sylvania and Rhode Island.	243	433,385	Drills		
Illinois .....	279	95,653	Surface .....	934	1,695,111	Electric .....	(a)	3,485,734
Ohio .....	38	29,099	Massachusetts ..	217	832,269	Ohio .....	(a)	1,347,219
New York and Pennsylvania ..	32	132,378	Connecticut and Rhode Island...	486	564,928	Pneumatic .....	11,627	1,108,839
California, Dela- ware, Indiana and Michigan...	89	111,513	Cutter tool and knife	1,535	716,564	Illinois, Michi- gan and Ohio...	11,627	1,108,839
Boring Machines—			Ohio .....	1,011	224,039	Hammers, Pneu- matic .....	30,513	3,467,486
Horizontal .....	255	1,412,224	Connecticut, Mas- sachusetts and Rhode Island...	367	346,879	Illinois and Michi- gan .....	27,097	3,177,102
Ohio .....	117	560,114	Internal .....	932	2,893,307	Maryland and Ohio .....	3,416	290,384
Pennsylvania ..	29	192,707	Massachusetts and Vermont .....	747	2,148,488	Grinders, Electric...		1,454,273
Illinois, Massachu- setts, New York and Wisconsin...	109	659,403	Iowa, Pennsylvan- ia and Wisconsin	185	744,819	Ohio .....		182,827
Vertical .....	397	1,759,964	Other .....	2,634	4,301,124	Other types not dis- tributed as to class .....		4,291,453
Illinois .....	91	319,970	Connecticut .....	145	84,964	Ohio .....		716,788
New York and Ohio .....	125	999,758	Illinois .....	307	490,306	Illinois and Penn- sylvania .....		3,249,823
Broaching Machines ..	255	371,827	Massachusetts ..	135	126,642	Presses—		
New York, Penn- sylvania and Ohio .....	31	68,908	Michigan .....	174	136,069	Hydraulic		
Cutting-off Machines—			Hammers (stationary)—			Bending and form- ing and forg- ing .....	389	1,895,692
Rotary-cutter type..	135	261,687	Steam or air, and power (belt or motor - driven), and other .....	283	310,618	Ohio .....	39	30,895
New York, Penn- sylvania and Ohio .....	80	217,267	Pennsylvania ..	94	272,461	Pennsylvania and Wisconsin ..	306	1,773,706
Hacksaw type .....	2,027	352,456	Drop .....	152	196,649	Power for sheet metal work ..	5,199	5,625,880
Illinois, Indiana and Wisconsin...	2,027	352,456	Ohio, Pennsylvania and Rhode Island	152	196,649	New Jersey .....	575	584,632
Drilling Machines (ex- cept portable)—			Lathes—			Ohio .....	1,401	3,370,520
Multiple-spindle ....	1,078	3,281,236	Engine .....	6,700	7,131,637	Illinois and Indi- ana .....	2,078	856,163
Michigan and Ohio	658	1,907,618	New York .....	383	235,882	Punching Machines (stationary) ..	597	858,102
Illinois, Indiana and Wisconsin...	289	986,694	Ohio .....	2,132	3,637,849	Ohio .....	112	182,119
Radial .....	552	1,695,437	Connecticut, Mas- sachusetts and New Hampshire	723	1,582,353	New York and Pennsylvania ..	41	224,641
Ohio .....	452	1,388,488	Bench .....	1,050	215,535	Riveting Machines...	1,336	664,307
Illinois, Massachu- setts, Michigan and Wisconsin...	100	306,949	Massachusetts ..	416	147,739	Illinois .....	343	351,295
Sensitive .....	3,691	1,716,921	Ohio .....	506	43,546	New York, Ohio and Pennsylvan- ia .....	418	149,383
Ohio .....	1,075	133,015	Connecticut, Illi- nois and New Jersey .....	128	24,250	Screw Machines—		
Massachusetts, New Hampshire and Rhode Island .....	1,469	989,066	Turret (including hand-screw ma- chines) .....	1,651	4,176,823	Multiple-spindle ...	825	3,321,503
Vertical .....	1,795	1,516,814	Indiana and Ohio.	1,128	2,918,010	Connecticut and Vermont .....	692	2,890,970
Illinois .....	867	624,490	Planers .....	235	1,852,396	New York and Ohio .....	133	430,533
New York and Ohio .....	865	843,108	Ohio .....	137	1,237,892	Single-spindle ....	985	1,887,199
Forging Machines—			Milling Machines—			Connecticut, Ohio, Rhode Island and Vermont...	985	1,887,199
Bolt, nut, and rivet ..	663	1,829,707	Power feed			Shapers .....	986	1,628,775
Connecticut, Mich- igan and Ohio...	663	1,829,707	Plain .....	941	2,216,272	Connecticut .....	161	324,939
Gear-Cutting Machines—			Ohio and Wis- consin .....	672	1,757,322	Ohio .....	539	816,640
Formed and disk- cutter type and other .....	230	626,664	Connecticut and Rhode Island.	269	458,950	Illinois and Michi- gan .....	92	195,916
New York .....	70	227,688	Universal .....	713	1,675,165	Shears (power) .....	1,771	1,308,169
Generator-hobbing type .....	703	2,237,822	Ohio and Wis- consin .....	302	737,111	Illinois .....	132	104,052
New Jersey, Ohio, Rhode Island and Vermont...	703	2,237,822	Vertical .....	488	1,597,826	Ohio .....	258	365,020
Grinding Machines—			Massachusetts and New York	231	968,299	New York and Pennsylvania ..	353	339,500
Cylindrical			Planer type, and other types...	930	2,879,842	Slotters .....	32	199,154
Plain .....	1,007	2,926,404	New York .....	284	831,334	Ohio and Pennsylvan- ia .....	14	125,706
Massachusetts and Rhode Island .....	567	1,416,569	Ohio .....	432	136,135	Threading Machines (ex- cept for pipe)—		
Universal .....	408	715,070	Illinois and Michigan .....	101	1,556,640	Die type .....	538	546,209
Massachusetts...	70	124,987	Pipe-cutting and Threading Ma- chines .....	2,281	1,344,145	Massachusetts, Ohio and Penn- sylvania .....	465	516,044
			Ohio and Pennsylvan- ia .....	1,960	998,751	Connecticut and Wisconsin .....	73	30,165
			Illinois and Michi- gan .....	105	139,496	Tapping type .....	484	584,730
						Ohio and Pennsylvan- ia .....	264	411,054

(a) Data incomplete.



# Changes in Machine Tool Design

## Production Possibilities of Cemented Tungsten-Carbide Tools Foreshadow Stronger and More Powerful Machines

*The high cutting speeds obtainable, the demonstrated capacity to machine materials that cannot be cut by ordinary tools, have stimulated wide interest in carboloy and similar tungsten-carbide products.*

*Although of comparatively recent development, these tools suggest the possibility of changes in machine tool design to permit their highest productiveness. Certain directions that such redesign should take were outlined recently by E. G. Gilson and G. N. Sieger of the Carboloy Co., New York, in a paper at a joint meeting in Chicago of the American Society of Mechanical Engineers and the Western Society of Engineers. Extracts from this paper are printed below.*

**C**ARBOLLOY has been applied to cutting a wide range of materials; non-metallic substances, such as fibers, hard rubbers, phenol compounds, carbon and graphite; non-ferrous compounds, such as copper, brass, soft bronze, very tough bronze, copper tungsten, 'elkonite,' aluminum, and its alloys as used more especially in the automotive industry; and ferrous metals, such as cast iron with its hard and sandy inclusions and hard scale, carbon steels, and many of the alloy steels. In this connection an outstanding accomplishment is the machining of Hadfield's manganese steel which, as will be remembered, has, up to the advent of this hard-metal compound, been considered unmachinable. Hard carbon steels have also been machined.

### Operate at Unusual Cutting Speeds

"In cutting the various materials enumerated an outstanding phenomenon is the ability of the tool to withstand many times the conventional cutting speeds now employed. This, of course, indicates the possibility of increased production. In the hard-rubber and bakelite fields, for instance, cutting speeds equivalent to those used with the diamond are possible.

"Emphasis has been laid on the brittleness of cemented tungsten carbide and the tendency toward failure because of undue shocks. These weaknesses should not be underestimated. On the other hand, they should not be stressed to the point of not using the tool because of these considerations. Attention is called to the cuts on the sash weight illustrated, which are of such nature as to subject the tool to severe shocks or blows. These welded spots are extremely hard.

"The rough cutting shown is probably due to inadequate tool support, or lack of strength in the tool carriage. The ordinary tool post or tool clamp is a serious offender in this respect. As a matter of fact cases have been encountered where it is necessary for best performance with cemented tungsten-carbide tools to remove the cross compound slide completely and build up directly from the tool carriage with a solid bolster and tool clamp.

"Mention has been made of the lack of strength of carboloy. Closer attention should be paid to this point as it must be given serious consideration in the design of tools.

Cemented tungsten carbide should never be used when it is not thoroughly supported by steel. The design of the tool should be such that when it is applied to the work the cutting strains are all transmitted through the carboloy to the steel backing, and the application should be such that the carboloy is under compressive strains only. Overhang of the material or an application which submits it to great shear should be absolutely avoided."

### Tailstock Center a Problem

"In lathe work where the tailstock center is used, either adequate means of lubricating the present type of dead center must be developed, or a type of live center must be found to take its place. At the present time no adequate way of lubricating the dead center has been devised and no live center tested has been equal to the job. The most serious objection to the live center has been the chatter of the work. In using carboloy tools on work which must be turned between centers, the problem of the tailstock center, while apparently of minor importance, is really a serious one.

"At a recent exhibition of cutting with carboloy tools, a piece of 'hytensel' manganese bronze was brought in from the outside. The best previous record of cutting speed on this type of metal was 15 ft. per min. Using carboloy tools, the maximum lathe speed and motor power were utilized which meant that the material was cut at the rate of 460 ft. per min., with a depth of cut of 3/16 in. and a feed of 1/32 in. The specimen was rapidly consumed at this rate of cutting but the tool remained in the same condition as at the start. However, the tailstock center had lost its temper and had become badly scored. A very short time longer and the demonstration would have had to be interrupted on account of failure of the tailstock center. A lubricant could not be applied by ordinary means to keep this job running. This is just one of many examples.

"Naturally, high-speed operation—very much higher than present practice—brings into consideration other factors of machine tool design, an outstanding example of which is bearings. Having pointed out that chatter and vibration are extremely detrimental, it is realized that this statement also holds for present-day tool practice although these factors are not of the same importance as when cemented tungsten-carbide tools are employed. Many cases of chatter or vibration originate in the 'head' of the machine, particularly in the bearings. This emphasizes the need for better bearings, both in design of the bearing proper as well as lubrication. When operating at the increased speeds necessary for the most economical use of the cemented tungsten-carbide tools, lubrication of present-day machine tools is entirely inadequate. Many cases have developed in which the limitation was the lack of lubrication of the bearings of the machine being used. Better materials should be used in the bearings, better fits are necessary and thorough lubrication must be assured. This means that it is practically necessary to redesign the power-transmitting members of the machine.

"It is also evident that more power must be transmit-

ted to the cutting point of these new tools. A cemented tungsten-carbide tool is used because of its greater output per machine. Thus, more metal is removed per unit time, and this in turn increases power consumption. This increase, which may be as much as 100 per cent, obviously must be transmitted from the driving medium to the tool point. It should be repeated that the power per unit of metal removed may be reduced but more work is done per unit of time.

"Rigidity of all power-transmitting members is of prime importance. Gears must be smooth running, well balanced and of ample strength. Power application should be made close to rigid support members and never on a shaft midway between bearing supports. The design of power-transmitting shafts should be so ample that all torque vibration is eliminated. With due attention given to these details, together with properly designed and lubricated bearings, as mentioned above, economic employment of carboloy should be in order.

#### Coolants Will Be Used, as Now

"The major experiences so far had with carboloy cutting tools have been without the use of coolants or lubricants, although unquestionably their use should tend toward the same results and in the same ratio as in present-day practices. Coolants and lubrication have not been employed for the simple reason that the machines were not capable of utilizing the carboloy tools to their maxi-

mum capacity and therefore no attempt was made to complicate the problems by these additions. When data are gathered for ultimate machine tool design, unquestionably coolants and lubricants will occupy an important place.

"The hardness of cemented tungsten carbide has been stressed. Tools must have sharp edges in order that they may be utilized for cutting and the question of grinding naturally arises. While carboloy will make a groove in the ordinary emery wheel, and while the ordinary abrasive wheel is not at all satisfactory for grinding cemented tungsten carbide, wheels of both domestic and foreign production, which make commercially possible the employment of these tools, are available and on the market.

#### Efforts Concentrated on Lathe Tools

"In turning work, practically every application has been to the single-point cutting tool in contradistinction to tools of the multiple-cutting-point type.

"At the present time practically all efforts are concentrated on the production of tools for the lathe and boring mill. This does not mean that intensive work has not been done in other lines. As a matter of fact work is under way now on practically every possible adaptation of carboloy. Thus, it is being applied to drills, reamers, cutters, drawing dies, saws for metals, slates, marbles and wood, and as a substitute for the diamond in rock drilling, oil well work, etc. Promising results in all fields have been obtained.

## Recent Developments in Atomic Hydrogen Welding of Alloys

**A**PPARATUS used in atomic hydrogen welding is simple, consisting of two tungsten electrodes and an electric arc established between them. Everything is shielded by a frame of hydrogen, according to a paper by Peter P. Alexander of the Thomson Research Laboratory, General Electric Co., before the Industrial Heating Conference, Massachusetts Institute of Technology. The torch used for welding is simplicity itself—support to hold the electrodes, and two tubes directing a hydrogen flame around them. All energy supplied to the weld is from an electric circuit. The gas serves only to shield the electrodes, to protect the metal from oxidization and to increase the efficiency of the arc.

If an arc of the same current and length be maintained in an atmosphere of hydrogen, the potential drop along the arc core will be 15 times as great as in nitrogen. Hence, by blowing hydrogen toward this arc, the efficiency is increased. In this way it became possible to use the indirect arc in a very efficient way.

As all the energy comes from the electric circuit, this is essentially an electrical process of welding. Yet it possesses all the characteristics of a gas welding process, and is adaptable to the welding of thin materials. Another field of its application is welding of special alloys and low-melting-point alloys.

In the atomic hydrogen process the electrodes are non-consuming, but we can add material to the welded plate from a welding rod of any desired composition. If this is attempted with direct arc, with an electrode high in chromium or carbon, it will be almost impossible to maintain an arc.

It is almost impossible to weld aluminum and other light alloys with the direct electric arc, but they can be welded with gas. On account of very low melting point of these alloys when arc is established between electrode and plate, much of the metal is vaporized. But with indirect arc, the temperature may be kept easily within the desired limits.

Hydrogen protects the alloys from oxidation. The

greatest obstacle to welding aluminum is the formation of aluminum oxide, which prevents the metal from running together. With atomic hydrogen welding, it is possible to weld aluminum under certain conditions without this danger of formation of aluminum oxide; it is even possible to reduce to its metallic state the aluminum oxide already formed. Still, it is not practical yet to use the atomic hydrogen welding process for welding thin aluminum sheets without fluxes, on account of the desire to maintain a high speed of welding the thin materials. Hence, in practical applications of the torch for welding thin aluminum sheets additional fluxes are used.

### Corrugated Iron Roof Serviceable After Seventy Years

Corrugated iron, galvanized, has been used in the Philippine Islands for roofing the more pretentious buildings for the last century. An observing traveler cannot help but be impressed by the sight of such roofs, remaining in good condition on church buildings which have been abandoned and evidently without care for many years. L. J. Lewery, Pacific manager for Armco International Corporation, has collected information about these old buildings, searching church and governmental records.

The oldest roof located is on a church, the dome of which was completed in 1860 at Cabatuan, Iloilo province, Island of Panay. The roofing and siding on this dome was bought from Morewood & Co. of London and Birmingham. The church is not now used regularly, and the town "presidente" remembers no repairs that have been made to the roof. At the present time the weather side has lost nearly all the zinc coating, yet the iron base appears to be in excellent shape.

At the present time a committee representing the Insular Bureau of Public Works and the Bureau of Science is systematically gathering service records of corrugated iron and steel sheets.

# No Signs of Real Overproduction

P-V Line Slightly Upward, But Caution Is Sounded as  
to 1930 or Late 1929—Imports Presage  
Good Business

BY DR. LEWIS H. HANEY  
DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

## Favorable Factors

1. Sustained activity in automobile production.
2. An increase in unfilled steel orders (though at a less rapid rate); high machine tool orders.
3. Increase in employment and payrolls.
4. Increase in foreign trade, both exports and imports gaining more than usual in February.
5. Fairly stable commodity prices (though very recently the trend has been downward).
6. High average earnings and dividends of industrial corporations.
7. Strong financial position of most leading companies.
8. Light mercantile inventories.

## Unfavorable Factors

1. Tighter money; excessive speculation.
2. Sharp decline in building permits and contracts in February.
3. A P-V line indicating that the general supply of commodities is rather large in comparison with the demand (though in fairly close adjustment).
4. Industrial production, including iron and steel, at peak levels.
5. Large and increasing stocks of manufactured goods in producers' hands.
6. Declining trend of retail trade, as represented by department store sales.
7. Some signs of inflation in the copper market and some duplication of steel orders.

**B**USINESS in basic lines is very active. Under the leadership of the automobile, machinery, steel and metal industries, it has shown a more than seasonal expansion. It is likely to be sustained at a high level for at least another two months. With employment and payrolls still tending upward, with exports expanding, and domestic supplies not yet excessive, no early decline is probable. Nevertheless, the wise business man will heed the warnings of the money market and declining building activity. He will note that such high levels of industrial production as the present have never been long maintained. Such a situation as exists in the copper and automobile industries, and to some extent in steel, cannot last forever. (The copper market had a similar runaway period in 1919 and again in 1923—both shortly preceding the peaks of business cycles.)

Caution is to be recommended to those who are looking ahead into the latter part of the year or into 1930, for several indications suggest the possibility of a recession in business later on.

## No General Overproduction Noted

**O**UR P-V line (a ratio of commodity prices to the physical volume of trade) has recently moved about sidewise. In February, both

prices and physical volume showed slight increases, with practically no change in their relationship. This may be taken as an indication that the supply of commodities coming to market at present is not too large to allow absorption by the demand at current prices. In short, no general overproduction seems to exist. Or, to put the matter in another way, demand and supply are in approximate equilibrium and commodity price averages show stability.

This barometer continues to indicate that commodity markets are not so strong as a year ago. It has made a net decline during the year. It is still, however, above the base line, and usually business does not reach a peak until after it has fallen below 100 per cent. For example, compare it with the curve of steel production in 1923 and 1926, as illustrated in the accompanying chart.

The steel production curve continues to move irregularly sidewise, due allowance being made for both normal growth and the usual seasonal variations. It seems to be well in line with the indications given by the P-V line. Nor does it seem likely that March production has shown much, if any, more than a seasonal gain over February, if we use the average daily production as a basis of comparison. The adjusted production index is actually a little below the

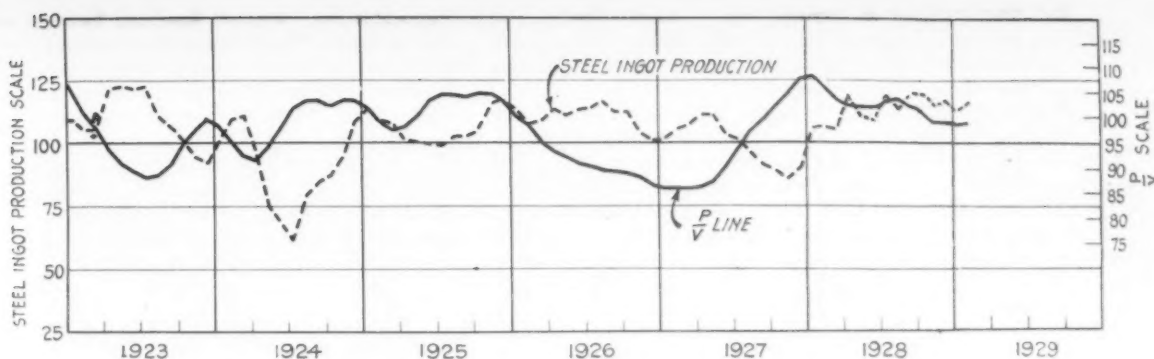
peaks reached in 1923 and 1926. It is even lower than in April, 1928.

## Automotive and Building Construction Move Oppositely

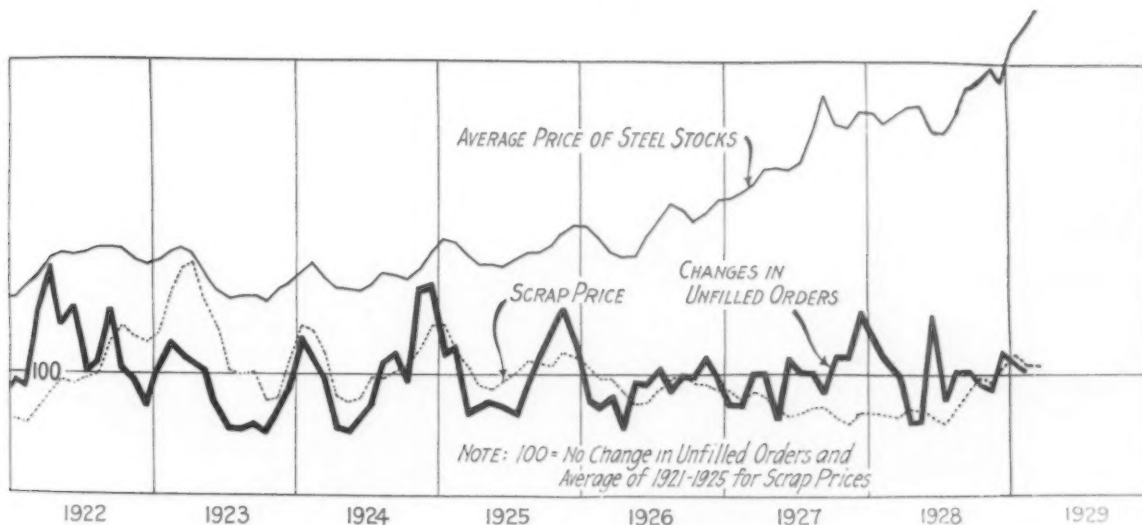
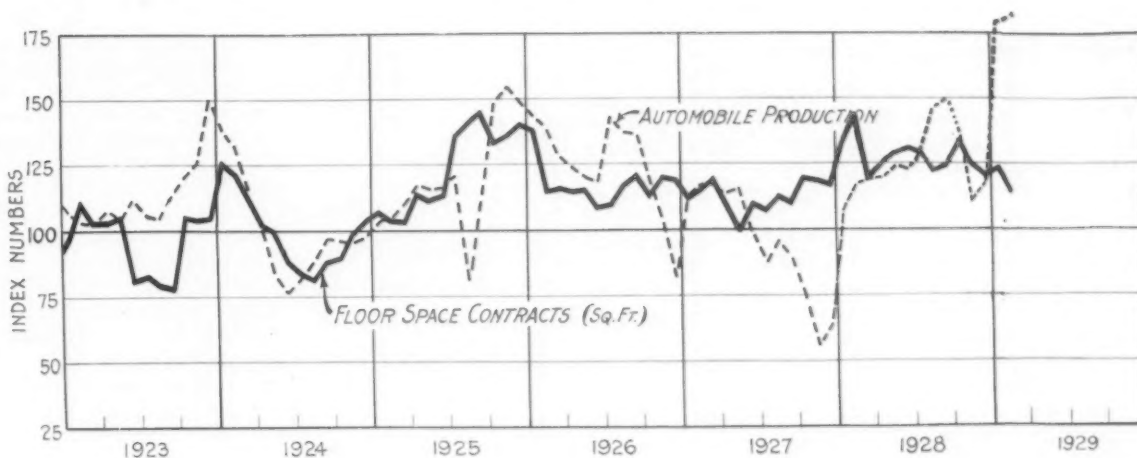
**T**WO of the great key industries, which are incidentally among the largest customers of the steel makers, continue to show a strikingly divergent trend. On the one hand, the automobile industry has reached the highest peak it ever attained; on the other hand, building and construction are much below former peaks and are declining. Probably this situation accounts for the mixed conditions found in business, and for some elements of uncertainty in the steel industry, in spite of its high general activity. Incidentally, we note that orders for sanitary enameled ware, radiators and boilers all reflect a slackening in building activity, and that these products are important elements in the demand for pig iron.

It is interesting to note that the P-V line at most points corresponds rather closely with the general trend of the building curve, and generally leads it. Also, since 1924, the automobile production curve clearly has influenced steel production quite markedly, as seen, for instance, in the dips in early 1926 and toward the end of the same year, as well as in the decline in 1927. This conforms to the



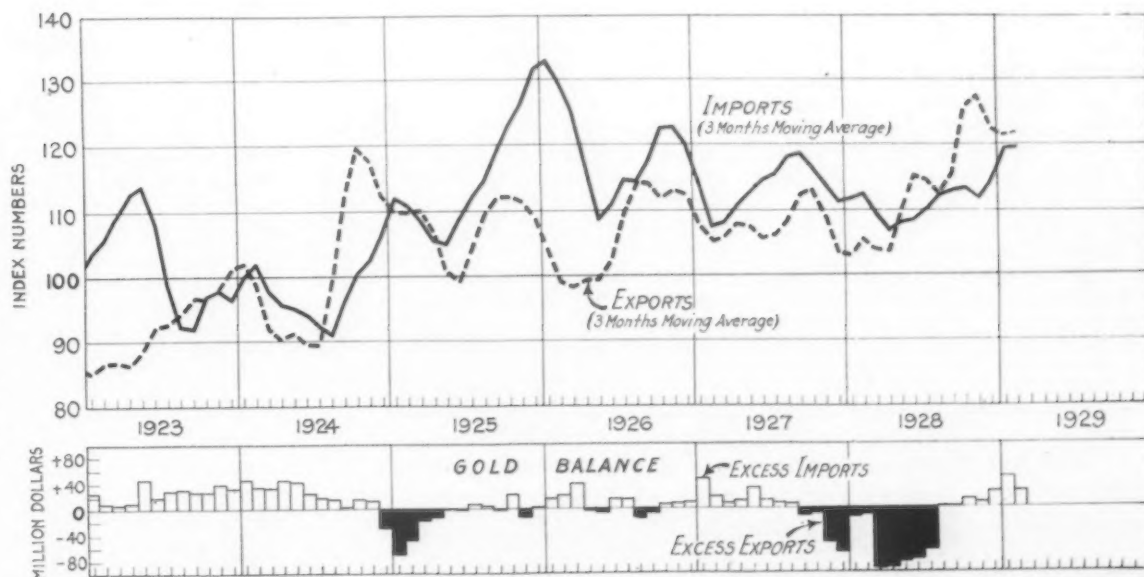


Automobile Output Moved Higher in February, Reaching Another New High-Record Level. Building Has Been Moving Downward Since October



Unfilled Orders, While Upward Again, Showed a Smaller Gain. Stock prices are making new high records and scrap prices remain higher than for several years

Imports, Which Are Regarded as a Good Index of Domestic Industrial Activity, Were Still Higher Than in January. But exports remain above imports. Gold movements are slight and contradictory



fact that building in general forecasts steel production, while automobile activity and steel production tend to move together. In a broad way, and with considerable roughness in the application of the idea, we may say that building tends to forecast the automobile production trend.

To the extent that these surmises have any validity, it becomes probable that building will continue its gradual decline, that a reaction in automobile production will come in a few months, and that at about the same time steel production will decline.

### *Import Barometer Favorable*

**A**MONG the more favorable indications as to business trend is the fact that both exports and imports showed a rising movement in February, and were considerably above normal. Imports are a good barometer of general business and their upward trend since early 1928 is, therefore, encouraging. Allowing for seasonal variation, the figures for January and February were above the line of normal growth.

It would be unusual for the peak of a business cycle to be reached before imports had run above an average relationship with exports, as they did in 1923 and 1926. Moreover, such a spurt in exports as occurred in the second half of 1928 usually characterizes the first half of a business cycle. It does not seem probable that any sustained business recession will appear until the curve of imports, as shown in the accompanying chart, has risen above the curve of exports and then begun to decline.

### *Unfilled Orders Point Downward*

**W**HILE the unfilled orders of the Steel Corporation increased in February, the increase was at a less rapid rate than formerly. Thus the rate-of-change line turned downward, and declined for the second month in succession. While the levels of this line have little significance, the direction is generally important. Of course, there has been no such up-surge in unfilled orders as in 1922 or 1924, and no great excess of forward buying has been revealed as yet. But even the minor decline in this barometer may well be an indication that the present expansion in the steel industry and allied lines will not last much longer.

The price of heavy melting steel scrap at Pittsburgh averaged lower in February than in January, and showed a still lower average in March—\$18.44 against \$18.63 in Feb-

ruary. Thus, as is so frequently the case, the unfilled orders barometer has anticipated the change in the scrap market.

The average price of a group of steel stocks broke severely with the rest of the stock market early in the fourth week of March. At this writing steel stocks average about 8 points under the high level of the year. As shown in the chart, however, the average price for the month to date is still higher than the average for February. Moreover, the great volume of steel production, at prices appreciably higher than last year, means prosperity in the steel industry for several months to come. The only questions are: Has this prosperity not already been discounted? Is a less favorable situation later on still to be discounted?

### *Business Responsibilities, Topic at Convention*

**WASHINGTON, April 2.**—The seventeenth annual meeting of the Chamber of Commerce of the United States, to be held in Washington on April 29-May 3, will deal with current economic problems and their effect upon business development. Among the leading questions to be discussed will be those concerning the future of small business, credit supply and the stock market, relation of business to agriculture, making of a tariff, impact of science on business and taxation. High government officials and distinguished business leaders will participate in the discussions. Some of the speakers listed include Secretary of Commerce Robert P. Lamont; Chairman Willis C. Hawley of the House Committee on Ways and Means; President William Butterworth and Julius H. Barnes, former president of the National Chamber; Leonard P. Ayres, vice-president, Cleveland Trust Co.; John G. Lonsdale, president, National Bank of Commerce, St. Louis; Paul Shoup, president, Southern Pacific Co., and John H. Fahey, Boston publisher.

The general sessions will be devoted to subjects of broad interest, while the round table conferences will be more intimate and informal. The latter will deal with such subjects as trade practice conferences, industrial expansion and national manufacturing capacity, etc. All discussions in the general sessions and round table conferences will relate to the central theme of the meeting, "Growing Responsibilities of Business." In announcing the preliminary program, President Butterworth said, in part: "Probably never before in the his-

tory of American business was there such a great need for concerted action among business men in attacking their common problems as exists today. Everywhere great economic changes are altering the channels of business progress. Old lines are disappearing and new ones are taking their places. Tried processes fall before the onslaught of science, and competitive currents move in a broader sweep."

### *Machine Tool Dealers Adopt Standard Price Sheets*

The Associated Machine Tool Dealers, which has been working for about a year in cooperation with the National Machine Tool Builders' Association toward the adoption of a standard form of price sheets for machine tools and allied equipment, has issued a set of instructions regarding the standards decided upon.

A multiplicity of sizes and styles of price sheets issued by the manufacturers has led to such confusion and inconvenience that a resolution was adopted by the Associated Machine Tool Dealers at its May, 1928, meeting for the appointment of a committee to recommend changes to a standard basis.

It is said that machine tool salesmen are, under present conditions, obliged to carry three or four price books because of the variations in sizes of sheets, punch holes, etc. The new plan provides for a single binder, which the dealers' association will provide for all of its members, and it will also provide the sheets, properly punched for loose leaf binders, for the manufacturers of tools.

Electrical manufacturers and others making parts or equipment which machine tool dealers handle will be invited to cooperate in the change. Information is being furnished by E. P. Essley of the E. L. Essley Machinery Co., 551 West Washington Boulevard, Chicago, secretary of the Associated Machine Tool Dealers.

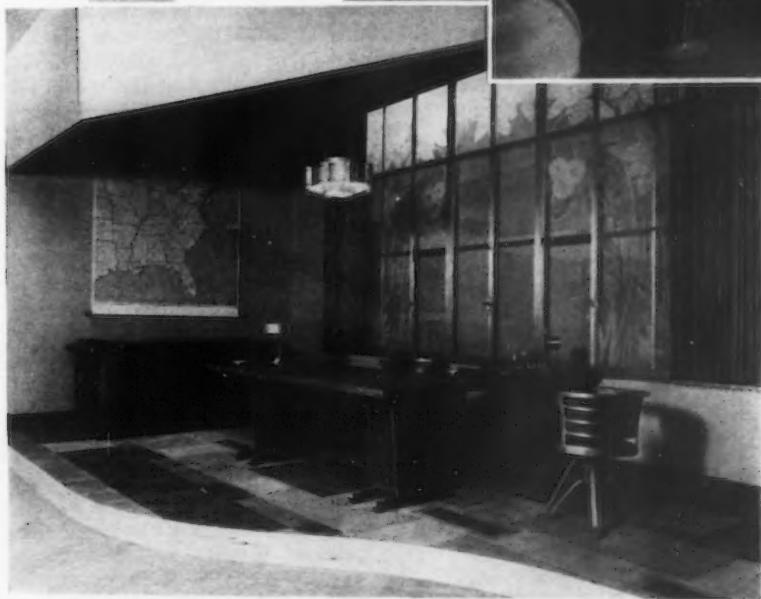
### *Testing Society to Hold Cast Iron Symposium*

Plans are rapidly taking shape for the technical program for the annual meeting of the American Society for Testing Materials, to be held at the Chalfonte Haddon Hall, Atlantic City, N. J., June 24 to 28. Two symposia are contemplated, one on cast iron, including high-strength cast iron, and the other one on mineral aggregates. Several contributions have been accepted in the field of corrosion and corrosion-fatigue.

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*Schedule of the next instalments of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director, New York University Bureau of Business Research, follows: April 18—Position of Iron and Steel Producers; May 2—Activity in Steel Consuming Industries.*

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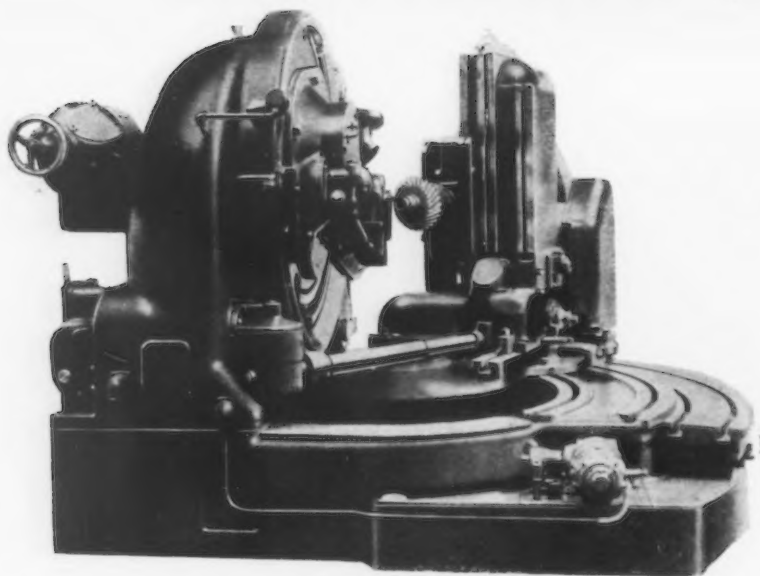


## STEEL IN MODERN FURNITURE

VISITORS at an exhibition of American design at the Metropolitan Museum of Art, New York, were struck by the extensive use of steel and aluminum in furniture for home and office.

THE various exhibits were planned by a committee of architects and the furniture and other effects were manufactured by various companies, including Kantack & Co., New York, garden furniture; Sterling Bronze Co., New York, cupboard doors; Sexauer & Lemke, New York, steel furniture and fountain; Schmieg-Hungate & Kotzian, Inc., New York, furniture; Noble Studio of Metalarts, Chicago, dressing table; Segar Studios, Inc., New York, metal furniture; Detroit Steel Products Co., Detroit, windows; International Casement Co., New York, windows; Renner & Maras, Inc., Long Island City, N. Y., over-mantel; Edward F. Caldwell & Co., New York, metal furniture; aluminum-trimmed office furniture by Oscar B. Bach, New York. Chrome plated steel was used on some furniture.





## 60-In. Hypoid Gear Generator

Special Work-Head Permits Cutting Small Spiral Bevels, As Well as Hypoid Pinions

FOR cutting large hypoids the Gleason Works, Rochester, N. Y., has developed the equipment here illustrated, which consists of a large gear generator, such as designed for spiral bevels, with the addition of a special workhead for cutting hypoid pinions.

In addition to the usual adjustments of the spiral bevel gear head, the hypoid head has two others. The work spindle can be offset vertically above or below center, so that the pinion can be cut in the same relative position in the machine as the position in which it is to run in the mating gear. There is also a small transverse adjustment of the head. The slides for these various adjustments

can be seen in the lower left-hand illustration herewith.

The hypoid head can be used for cutting spiral bevel pinions and gears of small pitch diameter, as well as for hypoid pinions. Approximate maximum dimensions of gears which can be cut by the machine are: 60-in. pitch diameter, 30-in. cone distance, 8-in. face width,  $1\frac{1}{2}$  D.P., 0 to 25-deg. spiral angle, ratios between 1:1 and 1:10, 10-in. vertical offset.

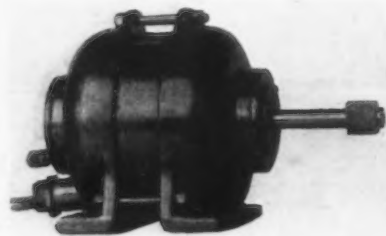
Hypoid gears, as described in THE IRON AGE of July 8, 1926, are tapered gears with offset axes. In general they look like spiral bevel gears, which in many cases they will displace. Two important advantages are claimed for the hypoids: First, the

small amount of lengthwise sliding of the teeth introduced by the offset tends to make them run smoother than spiral bevels and, second, the offset between the axes makes it possible for both gear and pinion shafts to continue past each other.

## High-Speed Bench Grinder for Diemakers

FOR grinding small openings in dies and for similar uses, Forbes & Myers, 172 Union Street, Worcester, Mass., is manufacturing a high-speed bench grinder in sizes from  $\frac{1}{4}$  to 2-hp. The  $\frac{1}{4}$  to 1 hp. machines operate at 25,000 r.p.m. and sizes up to 2-hp. at 12,500 r.p.m. They are made for one or two wheels, the  $\frac{1}{4}$ -hp. grinder illustrated being equipped with a  $\frac{3}{4} \times \frac{3}{4}$ -in. wheel which is retained on the  $\frac{1}{2}$ -in. shaft by a  $\frac{1}{4}$ -in. screw.

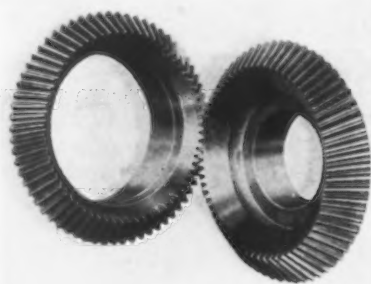
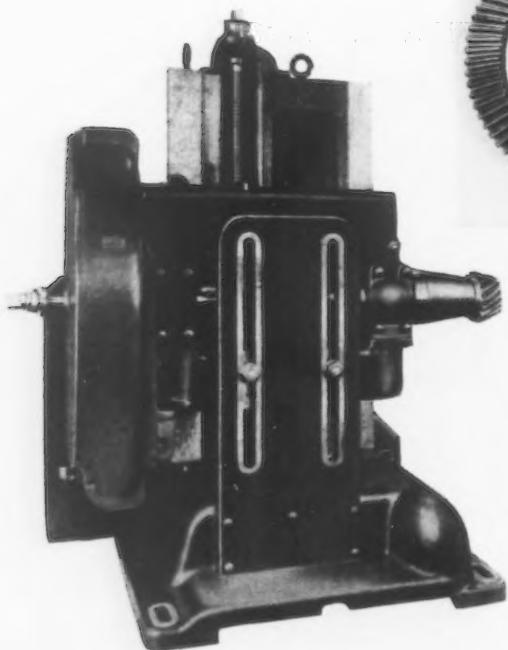
The grinding wheels and rotor are mounted on the same shaft. The motors have no brushes nor commutators and the rotor parts are welded into one solid piece. The motors are entirely inclosed, and the ball bearings provided are lubricated auto-



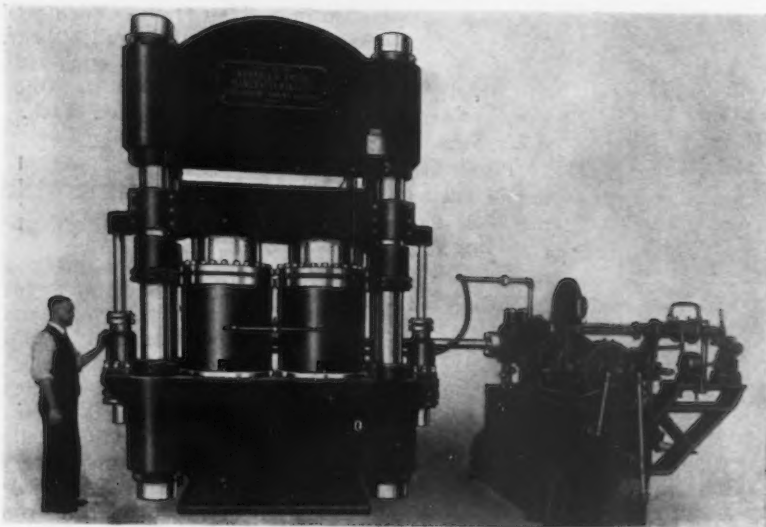
matically from a small reservoir below the bearing, the oil being passed by capillary action through a felt wick and porous disks which remove dust and grit. The disks lightly touch small rotating cones on the motor shaft and the disks throw the oil as a fine mist through the bearing, the oil finally returning to the reservoir. In this manner enough, not too much, oil is said to be supplied.

The high speeds are obtained through the high-frequency system, which requires one more motor than spindles, but the saving in brushes and belts is said to make up for the additional motor. Standard power current supplied to the first motor is changed by the frequency-changer to current desired for suitable speed. If changed to 420-cycle current, the motors can be operated at 12,500 r.p.m. or 25,000 r.p.m. or motors of both speeds can be operated together. Although more speeds can be obtained from a single frequency-changer, it is said that in general it is best to use a separate frequency-changer for each pair of speeds.

The Electro-Alloys Co., Elyria, Ohio, has recently completed the installation of a Moore 'Lectromelt furnace to be used in conjunction with research and production of special castings.



ARRANGEMENT of the Work-Head with Spindle That Can Be Offset May Be Seen in View at Left. A pair of hypoids, miters, is shown above, and a front view of the 60-in. machine at top of page.



## 1000-Ton Hydraulic Embossing Press

Working Pressure, As Well As Length of Stroke, May Be Varied—Operation Automatic

**R**APID automatic operation, and compactness are features of a hydraulic embossing press built by the Hydraulic Press Mfg. Co., Mount Gilead, Ohio.

Although capable of exerting 1000 tons pressure, the machine normally makes 15 complete cycles per min. when set for  $\frac{1}{2}$ -in. stroke, 12 cycles with a 1-in. stroke, eight cycles with a 2-in. stroke and seven cycles when set for a 3-in. stroke. The pressure exerted is regulated automatically and the working pressure, as well as the length of stroke, may be varied. The speed of operation may also be closely controlled. Means are provided for adjusting the opening between the platen and head of the machine, the maximum opening being 12 in.

The machine is double-acting, the working pressure being applied on the upward stroke and the ram returned rapidly to its lower position by means of two auxiliary hydraulic cylinders. When started the press performs and repeats automatically the following complete cycle of operations: Closes at a rapid rate; shifts automatically

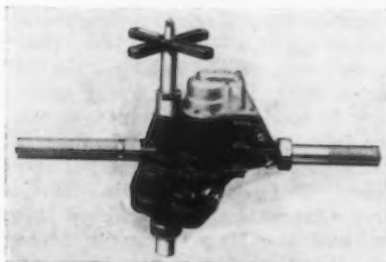
to a lower pressing speed; builds up pressure on the work to a predetermined maximum and holds this pressure for a predetermined time; releases the pressure and returns the platen of the machine to the initial starting position.

Hydraulic pressure required to operate the press is furnished by the company's "Hydro-Power" generator at the right-hand side of the press, the generator being of the company's patented two-stage type with direct motor drive. Automatic controls are incorporated in the generator. There are no valves on the press itself, two pipe lines being the only connection between the press and the pressure generating unit.

It is planned to build this type of press in a range of capacities from 250 tons up. Although designed for heavy embossing operations, machines of the same general type and operating on the same principle are being applied to other work for which mechanical presses were formerly used because of their higher rated operating speeds.

## Light-Weight Air Drill for Heavy-Duty Work

**F**OR heavy-duty  $29/32$  and  $1\frac{1}{4}$ -in. drilling,  $11/16$  to  $13/16$ -in. reaming and for heavy-duty nut setting, the Rotor Air Tool Co., 5905 Carnegie Avenue, Cleveland, is offering a new



pneumatic drill designated as the type E-5. The machine weighs only 22 lb. and can be handled by one man.

The improved governor and the new pear-shaped rotor incorporated in the company's D-3 grinder illustrated in THE IRON AGE of March 21, are also features of this machine. The governor controls the intake air and is claimed to reduce air consumption to a minimum. It instantly reduces the air supply when the machine is not under load and maintains maximum working speeds for the different applications without undue wear on the tools.

To the new rotor is attributed sub-

stantial increase in motor power, with the light weight, smooth operation and low maintenance cost of the previous design. Including the rotor, the motor has only three parts. Power is transmitted through compound gears, three standard speeds, 220, 280, and 350 r.p.m., being obtainable.

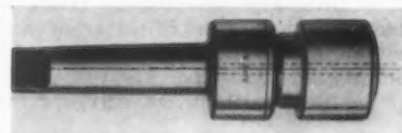
By removing the dead end handle, the machine may be used for close corner drilling. Lubrication is from an oil reservoir in the body of the machines. The feed screw is of heavy-duty type and has a travel of  $3\frac{1}{2}$  in. Motor cylinders are of semi-steel, gear housings of malleable iron and gears of nickel alloy steel, heat treated.

## New Floating Tool-Holders

**S**ELF-ALINING and floating tool-holders recently added to the line of the Apex Machine Co., Dayton, Ohio, are illustrated herewith. The full-floating self-alining holder, for single and multiple-spindle operations, is designed to take care of angular irregularities between the tool and the work and also allow the tool to float parallel to the axis of the rotating part. Floating parts are



The Self-Alining Full Floating Tool Holder (above) Is for Single and Multiple Spindle Use

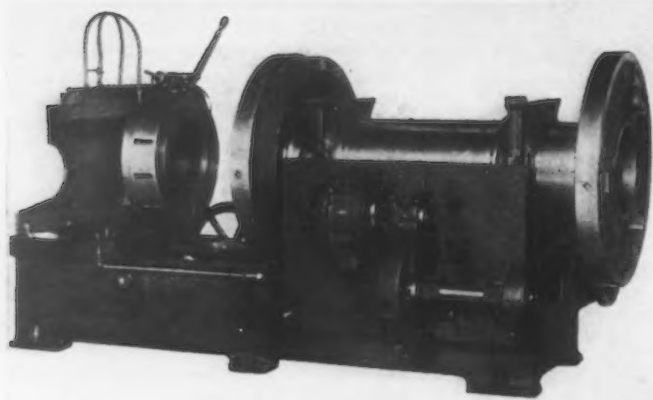


ball bearing equipped to eliminate friction and angular alinement is adjustable.

Both tools are furnished in several different sizes with straight or Morse taper shanks and with a bottom to hold straight shank or Morse taper shank tools, or the Apex quick-change drill chuck.

The floating holder permits the tool to enter the work on a straight line when the machine spindle and work do not line up, but their axes are parallel. The floating parts are in ball bearing equipped. The tool has  $3/16$  in. float,  $3/32$  in. each side of center.

The twelfth exposition of chemical industries is to be held at the Grand Central Palace, New York, the week of May 6. A feature will be a section devoted to food processing equipment which is expected to bring together 150 to 200 exhibitors whose products are directly applicable in the industry of processing and preparing foods. There will be a container section which is expected to bring out suggestions as to substitutes for tin plate.



ALL Sizes of Pipe, Casing and Tubing, from 4-in. Pipe to 13 3/8-in. Casing Can Be Cut and Threaded

## ★ 12-In. Pipe Threading and Cutting-Off Machine

INTENDED for oil field work, the capacity range of the duplex pipe machine here illustrated, which is built by the Bignall & Keeler Machine Works, Edwardsville, Ill., is from 4-in. pipe to 13 3/8-in. A. P. I. casing. The bore through the arbor is 15 1/4 in. in diameter, which gives ample room for passing oversize collars.

Eight speed changes are provided through broad face cut steel gears that run in oil in a compact gear box, one set of gears being outside of the box. A two-way positive clutch on the bed shaft has both fast and slow positions, and in addition to providing for quick starting and stopping of the machine, the clutch enables the operator to shift quickly to the higher speed for cutting-off operations on large pipe.

A three-jaw independent chuck is mounted at each end of the arbor, and either or both of these may be used for gripping the pipe. The rear chuck is equipped with flange grippers for

making and breaking up flanged fittings. The Peerless sliding die head can be arranged for dies of any width. Dies 2 11/16 in. wide are recommended by the company for standard pipe threading, dies 3 7/16 in. wide for D. B. X. casing and dies 4 7/16 in. wide for A. P. I. drill pipe and casing work. Full length threads are cut at one pass, and the dies may be changed quickly from one size, taper or thread to another. Cutting-off, beveling and reaming tools are regular equipment.

The carriage has a travel of 33 in. The drive may be by belt or motor, a 7 1/4-hp. motor being recommended for the latter. Reversing for left-hand threading and for pulling collars is accomplished through the counter-shaft or the motor, according to the drive arrangement. The weight of the belt-driven machine is approximately 12,000 lb. and the weight of the motorized machine is 13,000 lb. Floor space of 76 x 125 in. is occupied by the machine.

## Shop Truck Made of Welded Steel

ALTHOUGH designed primarily as a nail buggy for nail mills, the shop truck illustrated is suitable for use in other plants for handling scrap, small castings, forgings, and similar material.

This truck, manufactured by the Pittsburgh Producers Supply Co., Pittsburgh, is of welded steel throughout. Its rated capacity is 1500 to 2000

lb., with a tare weight of 150 lb. The body is 36-in. long, 24-in. wide and 24-in. deep at the maximum. It is made up of five pieces of 3/8-in. plate and reinforced at both ends by 2-in. x 1/4-in. straps which are welded in place. Bent rod bails are provided at each corner, so that the truck may be lifted by a crane. The handles of the truck are made of heavy tubes, flattened at one end. They are welded to both the straps and the body, and are reinforced by three gusset plates. The body is strengthened at the rim by a 1 x 1/4-in. angle.

The two side wheels are 30-in. in diameter, and the pilot wheel 8-in. in diameter. The treads of the side wheels are made up of 2 x 1/4-in. welded strips. The spokes are of pipe, welded to both the tread and the hub and staggered to provide maximum strength. The hubs are of seamless tubing. The axle is a square bar machined at the ends and is welded to the body. The pilot wheel has spokes of flat section and is supported on a stub



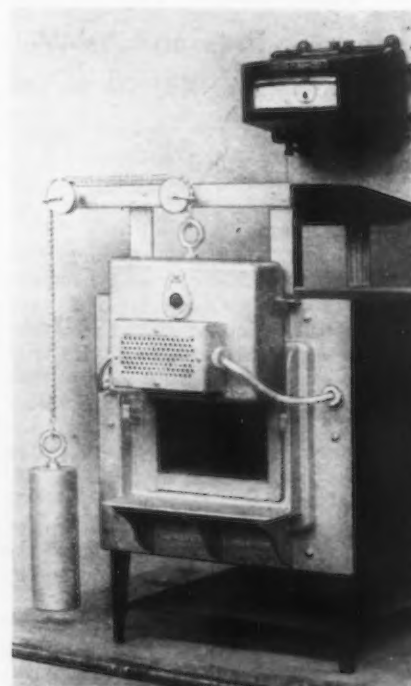
The Wheels Are Mounted in Timken Bearings

axle in a strap frame. Each wheel is mounted in Timken roller bearings, and the turning pin is equipped with a Timken thrust bearing. One man can handle a fully loaded truck.

## Automatic Temperature Control on Small Furnaces

PYROMETRIC control for small furnaces is provided by apparatus brought out by the Hevi-Duty Electric Co., Milwaukee, and here illustrated.

The controlling and indicating pyrometer was developed to provide automatic temperature for small furnaces, at a price consistent with their productive capacity. It comprises the usual type of motor-driven contact table, with a cold junction compensator, but includes a mercury



Self-Contained Electric Pyrometer for Furnace Control

switch to control the furnace line current without the use of a relay. It is a self-contained unit, which lends itself readily for mounting with the furnace, to provide a complete unit structure of the furnace and automatic control.

## Electrically Welded Steel Truck Body

Recent advances in electric welding have led to the development by the Columbia Steel Tank Co., Kansas City, Mo., of an all-steel truck body that is so designed and assembled that the entire body, including the sub-structure, is made into one integral unit. The interior of the body is thus perfectly smooth and may easily be kept clean. The body is proving particularly adaptable to the packing industry, and one large company already has more than 600 in use.



## Oil Drill Shaft 1 $\frac{1}{4}$ Miles Deep

Severe Conditions to be Met by Steel—Experience of Investigator When He Flies Back from California

**R**ETURNING early this month from a business trip to California, A. V. de Forest, research engineer American Chain Co., Bridgeport, Conn., had an experience which is not yet a common one; he went out by the usual method of transportation and came back by airplane.

Mr. de Forest is well known as a specialist in the magnetic testing of steel, but his trip to California was to study certain applications of steel in the drilling of the oil wells of that State. Recounting some of his experiences, he stated that these wells are 7000 ft. and more deep and are drilled with a long-handled auger. The handle, when at its best, is made of heat-treated seamless steel tubing. The conditions of stress, tension, torsion and compression, and the impact of dropping the whole "string" of metal on rock bottom, the fatigue of bending in a crooked hole, the sudden stress when a 200-hp. steam engine going 90 r.p.m. is suddenly stalled by stopping the end of a flexible shaft a mile and a quarter long—all these must be seen, felt and heard, he emphasized, to be properly appreciated.

There is more to this than pounds per square inch or dollars per foot of hole, says Mr. de Forest. A dozen wells may be started at once, a penalty bonus of thousands of dollars a day lies just ahead; organizations, men, materials and equipment are stressed far beyond working load or endurance limit, and the string of drill tube is among the items which receives no mercy. Investigating what may be considered a miracle why a drilling string ever stays together was one of the chief matters which occupied Mr. de Forest's attention.

In many respects Mr. de Forest's return trip was of such an unusual nature that he has been willing to outline the chief features and thrills—he returned from Los Angeles as a passenger in a United States mail plane:

"The mail plane leaves Los Angeles at 7.35 a. m., a splendid red, three-motor Fokker, with comfortable seats and room to move about, and with wonderful balance and stability. The view over Nevada and Utah revealed bare burned desert; sand, rock and sage brush, mountains red and brown and yellow in the Painted Desert and Death Valley. Until it became too cold I sat up forward next to the pilot. Clear and sunny and 6000 ft. up, the world looked 1000 miles in diameter. A Union Pacific train below looked like a black worm; it takes 26 hours to go the distance we did in six. When we got to Great Salt Lake the weather became cloudy, but the lake was a wonderful light green; you could see the bottom, but it must take good eyes for a fish hawk to see fish.

"At Salt Lake City we changed planes to the regular air mail—a Boeing biplane with Pratt & Whitney single engine—at 3.45 in the afternoon, with a cloudy and strong west wind.

Weather ahead poor but possible. No other passengers, as there is only room for two and these are squeezed in pretty tight. Lucky to get off, as they do not take any passengers in bad weather. There is no way for passengers to get out of the cabin in case the plane is lost in fog and a parachute is needed.

"We went up over a mountain range 9000 ft. high, with the tops in the clouds, and with the plane flying close to the ground up the narrow valleys, and a 40-mile gale behind. The ship jumped and pounded like a skiff in a 'tide rip' and it was like going through Woods Hole with the tide and a stern wind and all the buoys gone. Up on top, smoother, but a low ceiling and bad visibility, snow all over and cold. We went over a lighthouse and field where we should have been flagged down, but they could not hear us; the wind was making such a noise. I thought they had news of clearing ahead and, about 40 miles on, came fog and snow. We were trying to keep in sight of the Union Pacific track without getting in the telegraph wires.

"We finally turned back and circled around waiting for a fog bank to blow by and see some place where we could 'sit down,' if possible, near a section shanty on the railroad; but a little clear space opened up and the pilot found the emergency landing field and lighthouse. We came down on snow from 1 to 6 ft. deep with strong crust; broke through a bit taxiing to the gas pump and the tail went up, but by good luck came down

before the plane nosed over and broke up the propeller. The wind was blowing 50 miles an hour and it was 10 deg. above zero, right on the Continental Divide at Cherokee, Wyo.

"On one side of the caretaker's house you could walk up to the roof on the snow drift; they had been snowed in all winter. A gas truck had gotten in a month before with a big crew to shovel the drifts. Pilot DeGarmo kept the engine going all night so that it could be ready in the morning, for it cannot be started when cold. Just after we landed, it snowed a blizzard which lasted all night. Lightkeeper Perkins and his wife had a big stove, plenty of coal and a telephone. A train due at midnight was 16 miles away, but there was no chance to 'train the mail.' I certainly wished I were 'trained'; it looked like a week's stay. The keeper put a spare mattress on the floor for us but the wind sounded like two planes all night. The pilot got up every hour to see if the engine were going, and sometimes it was not.

"It cleared soon after daylight with large new drifts all over the field. The pilot said we would try to get up but the chances were poor. However, we did get the plane up and it was a great sensation to be up and flying over the train stuck deep in drifts. Forty miles on we passed another train and two locomotives with a couple of cars backing and bucking to clear the track. Then an hour to Cheyenne and on to Omaha and Chicago. Clear and cold in Nebraska, a flat country covered with snow. Occasional rough spots, but not bad. Landed half a dozen times for mail, gas and oil. After dark was the best time of all. Lighthouses, towns all lit up, and great dark spaces. Chicago was beautiful from the air, but a sea of mud when we got down."

### A. M. Byers Co. Insists on Resale Price Observance

The A. M. Byers Co., Pittsburgh, manufacturer of wrought iron pipe, under date of March 25, informed distributors of its product that failure on their part to observe resale prices named by the company would result in the cutting off of sales to them. The letter goes on to say:

"We have adopted this policy for the reason that we cannot obtain and hold the distributors who are our customers unless they are able to sell our products profitably. Any distributor who sells our products at prices which do not yield him a satisfactory profit will ultimately be detrimental and not beneficial to our business. Our distributors have tied up considerable sums of money in stocks of Byers pipe in order to render service to consumers. Sales of our product by distributors at unprofitable resale prices make the business unprofitable for all other distributors, and this results either in our distributors handling our trade unprofitably or possibly in discontinuance of the business.

"We have determined to prevent such situations in so far as legally permissible and to protect our customers and ourselves as well as the public, as it is not only to our own

interest but to the public interest that the distribution of our product be as widespread and general as possible, which can obtain only if distributors are assured of a fair profit in handling.

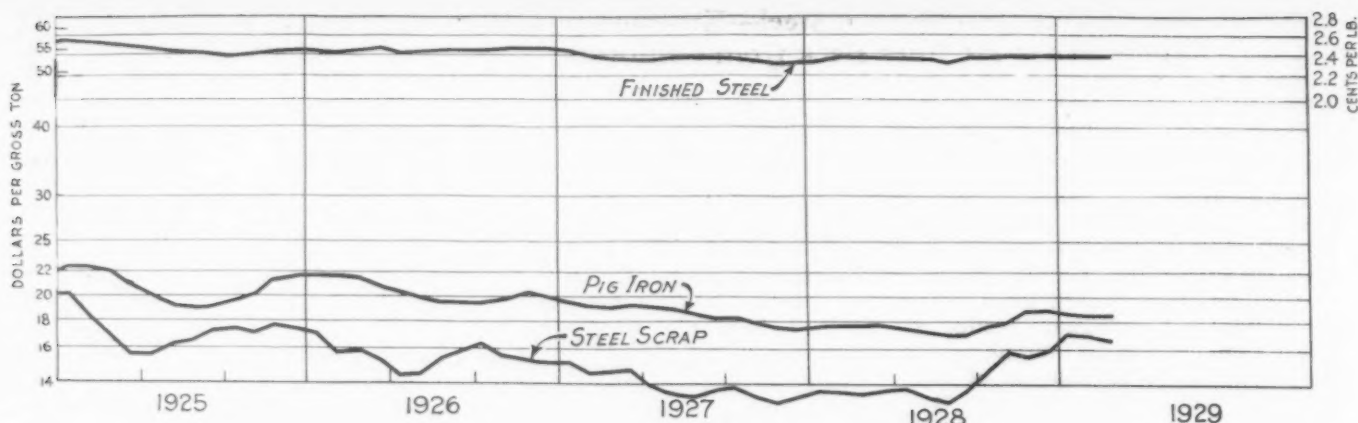
"We are advised that a manufacturer has the right to refuse to sell his goods to any one who resells them at prices below those which the manufacturer designates for their resale. We have therefore adopted the policy above announced, and will from this time on carry it out.

"We do not have the right to accept assurance or promises from any of our customers that they will conform to the designated resale prices. Therefore this letter is merely a notification of our own independent policy and no replies thereto are desired."

### Increased Foundry Activity

The gray and malleable iron foundries of Worcester, Mass., produced 4,356,460 lb. of castings in February, which compares with 3,344,557 lb. in February, 1928, an increase of 30 per cent. January's gain over the corresponding month of last year was on a similarly large scale. The foundry experience of the two months reflects the activities of the machine tool builders of the city.

That Scrap Prices Have Closely Approached Those for Pig Iron Is Amply Demonstrated by These Curves. By Contrast, Finished Steel Has Varied Scarcely At All



## Scrap Prices at High Level

Irregular Increases Make First Quarter Average Highest Since 1925—January Showed Maximum

AVERAGE prices of heavy melting steel scrap at Chicago, Philadelphia and Pittsburgh showed considerable advances in the first quarter, following the strength of the last quarter of 1928. The average for January was the highest for any month since the close of 1925; there has been a slight tapering off since then.

Maximum prices were reached at the end of January, when the composite was \$17.58. Six weeks later there had been a drop of just \$1, nearly half of which has since been regained. It is noteworthy that the maximum in January was higher by \$4.50, or 34 per cent, than the low level of \$13.08 reached 14 months earlier—in November, 1927. That was the lowest since 1922, whereas the January maximum was the highest for any week since December, 1925.

For the first quarter of the year the average has been \$16.90. This compares with \$15.85 for the last quarter of 1928 and with \$13.69 for the first quarter of 1928.

Meanwhile pig iron, which dropped last summer to the lowest level in more than 12 years, had recovered nearly \$1.50 by the end of the year and has sagged only fractionally

since then. The average for the first quarter was \$18.39, against an average of \$18.30 for the last quarter of 1928 and \$17.70 for the first quarter of 1928.

Finished steel has fluctuated narrowly since early 1927. There has been no change in many weeks from the level of 2.319c. a lb. This is the highest monthly average since January, 1927, but is less than 5 per cent above the minimum over that period, which occurred in November, 1927.

Comparative figures for the past 15 months, covering steel scrap, pig iron and finished steel, are given in the table. The diagram carries the story of these changing prices over a period of more than four years.

## Committee on Rustless Steels Organized by A.S.T.M.

The newest committee of the American Society for Testing Materials, designated as Committee A-10 on iron-chromium-nickel, iron-chromium, and related alloys, was organized March 7 at the headquarters of the society in Philadelphia. Jerome Strauss, research metallurgist Vanadium Corporation of America, Bridgeville, Pa., who has been acting as temporary chairman, presided.

There was a large attendance classified as representatives of 13 producers, 18 consumers and two of general interests, making 33 in all. It was decided to continue under the administration of the temporary officers until the next meeting, to be held during the annual convention in June. T. H. Nelson, consulting metallurgist, Philadelphia, was elected temporary vice-chairman, and N. L. Mochel, Westinghouse Electric & Mfg. Co., Philadelphia, temporary secretary.

These, together with four members to be selected by the temporary chairman, will constitute a temporary advisory committee to which have been

referred certain suggestions for additional members, the formulation of rules for committee procedure and the appointment of several committees to consider various lines of the committee's work. One of the tasks to be undertaken through an appropriate sub-committee is the revision of the tabulation of the properties of corrosion-resistant alloys, which appeared in the 1924 symposium on this subject.

## Inland Steel Employees Receive Common Stock

Employees of the Inland Steel Co., Chicago, received on April 1, 29,557 shares of Inland common stock as a result of their participation in the company's employees saving and profit sharing pension fund. More than 1000 employees received stock certificates. Although participation in the fund is voluntary, some 6000 employees, 77 per cent of the total number employed, are enrolled. Any employee who has been with the company 18 months is eligible to join. Participants contribute 5 per cent of their salary, but not over \$300 per year, while the company's share is 5 per cent of net earnings, before payment of any dividends. Inland common stock, purchased with these funds, is distributed to the employees at the end of five years' participation. The plan has been in operation for 10 years, and 72,815 shares have been distributed.

## American Sheet & Tin Plate Co. Abandons Two Plants

The American Sheet & Tin Plate Co. has decided to abandon its Sabraton Works, Morgantown, W. Va., and its Chester Works, Chester, W. Va. The Sabraton Works was built in 1902 and 1903, and has an annual capacity of 41,800 tons of black plate and 848,000 base boxes of tin plate andterne plate. The Chester Works was constructed in 1899 and 1900, and was first operated in December, 1901. It has a capacity of 34,600 tons of black plate specialties a year.

### COMPOSITE PRICES

	(Gross Ton) Steel Scrap	Pig Iron	Finished Steel, Lb.
1925 average ..	\$17.12	\$20.58	2.465c.
1926 average ..	15.48	20.42	2.439c.
1927 average ..	14.00	18.55	2.357c.
January, 1928 ..	13.70	17.63	2.318c.
February .....	13.71	17.73	2.361c.
March .....	13.65	17.73	2.362c.
April .....	13.81	17.67	2.359c.
May .....	13.90	17.45	2.350c.
June .....	13.52	17.23	2.341c.
July .....	13.13	17.10	2.325c.
August .....	13.75	17.11	2.348c.
September .....	14.75	17.54	2.348c.
October .....	15.85	17.94	2.363c.
November .....	15.73	18.46	2.368c.
December .....	15.97	18.51	2.385c.
Year's average ..	14.29	17.67	2.352c.
January, 1929 ..	17.02	18.43	2.391c.
February .....	16.96	18.38	2.391c.
March .....	16.71	18.36	2.391c.



# This Issue in Brief

New tungsten-carbide cutting material requires machine tools with better bearings and better lubricating methods. "When operating at the increased speeds necessary for the economical use of the new tools, lubrication of present-day machine tools is entirely inadequate," says engineer. Power transmitting members must be redesigned.—Page 948.

\* \* \*

Electric welding process can be extended to aluminum and alloys with low melting point, by using atomic hydrogen flame. The indirect arc permits the temperature to be kept within desired limits.—Page 949.

\* \* \*

Manganese embrittles rails only when carbon is high. Tests reveal that manganese of 1.20 to 1.50 per cent, with carbon 0.45 to 0.50 per cent, produces a rail of long life and almost entirely free from transverse fissures.—Page 940.

\* \* \*

Quench tank receiving carbonized parts has a revolving drum with a spiral, which causes the work to progress through the quench at a fixed speed. Then the work passes into an elevator conveyor and is discharged into wheelbarrows.—Page 945.

\* \* \*

Keeps costs down by insuring that every skilled workman devote every minute of his working time to activities which require his experience and skill, rather than those calling for mere physical strength. Wherever a workman is found unnecessarily engaged in handling parts by hand, cash register manufacturer investigates and, if practicable, mechanical facilities are provided.—Page 938.

\* \* \*

Effective inter-department parcel delivery system is provided by dividing big plant into three zones and having an electric truck in each zone make regular scheduled calls at 45-min. intervals. Trucks deliver through a centrally-located transfer station.—Page 935.

Saves initial heat in the steel by speed in getting ingots into soaking pit. Thomas steel ingots in German mill are stripped almost immediately after being teemed. Only 21 min. elapses from the time 30-ton converter pours until the last ingot is in the soaking pit. Majority of soaking pits are unheated.—Page 939.

\* \* \*

Cuts down idle time due to breakdowns by providing each millwright repair man with an electric truck carrying tools and repair materials. When an emergency call comes in, the repair man responds by going immediately on his truck to the place he is needed.—Page 936.

\* \* \*

Sharp gain in exports for first two months of 1929. Machinery exports for January and February were close to 96.5 million dollars, a gain of 33 per cent over same period of 1928. Iron and steel tonnage shipped out of country gained 36 per cent.—Page 995.

\* \* \*

Caution is to be recommended to those looking ahead into the latter part of the year, or into 1930, says Dr. Haney. Several indications suggest the possibility of a recession in business later on.—Page 950.

\* \* \*

"The popular idea that all there is to the labor problem is the worker's desire for wages is entirely wrong," says authority. Labor problem is administrative as well as economic. Industry needs men trained in study of human relations, who will avoid patronizing spirit, legalistic attitude and trading spirit.—Page 992.

\* \* \*

Accuracy of testing machines checked to within 1/20 of 1 per cent by simple, new device. Circular steel spring, with micrometer screw inside the ring, can be subjected to tensile or compressive forces. The load bears a fixed relation to the deformation of the ring.—Page 945.

In using the new cutting material, tungsten-carbide, be sure that tool design is such that cutting strains are all transmitted through to the steel backing, so that the tungsten-carbide will be under compressive strains only.—Page 948.

\* \* \*

Special coupling device guides trailers along the line taken by electric truck. This permits train of trailers (four or five) to turn corners in factory aisles.—Page 938.

\* \* \*

Fireless steam switching locomotive does away with smoke and dirt nuisance, and operates economically. Boiler of locomotive is connected by pipe line to header in power house in cash register plant, and receives charge of "live" steam and hot water, which lasts about 3 hr.—Page 938.

\* \* \*

No signs of over-production, says Dr. Haney. Relation of prices and output shows no change, indicating that supply is not too large to allow absorption at present prices.—Page 950.

\* \* \*

Reaction in automobile production will come in a few months, Dr. Haney believes. Steel production will follow, and building will continue its gradual decline.—Page 952.

\* \* \*

Tungsten-carbide tools cause trouble in lathe work where the tailstock center is used. Either an adequate means of lubricating the present type of dead center must be developed, or a type of live center must be found to take its place. Dead center cannot be lubricated adequately and all live centers tested permit chatter.—Page 948.

\* \* \*

Pig iron production sets new first-quarter record, with total of 10,363,028 gross tons. March daily rate averaged 119,822 tons, a gain of 4.6 per cent over February. On April 1 there were 212 furnaces in blast, a gain of 5.—Page 964.



A. I. FINDLEY  
Editor

# THE IRON AGE

W. W. MACON  
Managing Editor

ESTABLISHED 1855

## A Task for a Whole Industry

THE net profits of a leading steel company in 1928 were nearly 30 per cent larger than in the previous year, notwithstanding a price decline of \$1.38 a ton on domestic steel shipments and \$2.48 a ton on exports. A remarkable showing and a tribute to the efficiency of the organization.

The record becomes even more impressive when it is realized that the past four years have shown a total decline of \$8.68 a ton in prices received on domestic business and \$10.49 a ton on foreign shipments.

With this downward trend there has been an unremitting struggle to cut costs faster than prices have receded. The very extent of the economies thus far attained narrows the possibilities for further savings. Although, for the time being, steel demand and steel output are fairly well balanced, a subsidence of industrial activity will bring renewed pressure on production executives and more insistent cries for relief from destructive competition.

No time is more propitious than the present to prepare for such a contingency. As President Schwab counseled at the last meeting of the American Iron and Steel Institute—in time of prosperity prepare to keep prosperity. Among his suggestions for a preparedness program, the one most pregnant in possibilities is the cultivation of new uses for steel. As THE IRON AGE has repeatedly pointed out, no other field holds so much promise for united effort by members of the industry. The outstanding ability and the capable leadership shown in developing steel production could not fail to attain far-reaching results if applied to the problem of stimulating demand.

Excellent work along this line is now being done by certain branches of the industry, for example, by the structural steel fabricators and the sheet and strip makers. Activities on a much broader scale, however, are necessary not only to get the most effective results from present organized effort, but to take care of the requirements of those parts of the industry still wholly lacking in such programs. The problem confronting iron and steel manufacturers is one which demands the most careful attention of leading executives; it is one that can be solved only through group action of the broadest scope.

United effort is imperative not only to cultivate markets but to hold markets. In present-day competition industries are arrayed against industries, and those best organized have the advantage. Steel is constantly being displaced by concrete, brick, wood, copper, brass and other materials because of the unceasing campaigns of well financed and ably manned promotional organizations. The Portland Cement

Association has 32 branch offices at strategic points throughout the country and spends \$500,000 annually for advertising alone. Effective work is being done by the Copper and Brass Research Association. Since its organization in 1921 domestic consumption of brass has increased 125 per cent.

Leaders of the steel industry are eminently practical men and they are rapidly coming to realize that they must fight fire with fire. The merging of the sheet and strip associations into the National Association of Flat Rolled Steel Manufacturers was a step toward a broader and more inclusive program. The creation of one organization for all steel mill products, using existing associations as nuclei, would be a logical forward step in the evolution of promotional work. Present bodies could retain their identities as departments of the larger association, but a single directing policy, coordinating the activities of the constituent bureaus, would eliminate duplication of effort and would provide service for all mill products.

Undoubtedly steel manufacturers have been slow in undertaking so comprehensive a program because of the difficulties of organizing so large an industry. In view of the delay, however, need for such action is the more pressing. To persuade people to "say it with flowers" the Society of American Florists is spending \$500,000 a year for advertising. The Laundryowners' National Association is spending \$6,000,000 in a four-year advertising program. An effective campaign to increase steel consumption would call for comparable expenditures for publicity—in proportion to the greater size of the steel industry—as well as for adequate outlays for promotional work and research.

Better steel selling implies more effective development of consumption. Organized cultivation of potential markets is the best insurance against profitless competition for visible tonnage.

## Why Not Dams of Steel?

WHY not dams of steel? Habit and tradition continue to supply them of masonry. Yet it does not follow that such is the sole suitable type of construction. The engineer on serious reflection will admit the feasibility of steel. He has needed the help of the steel producer to get him thinking in that direction and to secure the approval of the public. No one will question the adequacy of steel. It will be easy to prove that strength and tightness can be assured. It remains that the matter simmers down to one of the economics of the case.

It is natural that concrete has become the ready and convenient substitute for the old earthen embankments, with their clay cores, and for the more

massive dams of stone masonry. Each type still will have its proper claim in a given impounding development. The future should see that the steel dam also enters into the calculations. For extreme heights and widths, the steel structure would clearly possess a reliability of design peculiar to itself and capable of outweighing even disadvantageous economic considerations. Well understood and trustworthy calculations rest with steel. Important is this fact in meeting doubtful projects of monolithic dams of sizes far beyond precedent, projects which, it is safe to say, are released for construction only after the most deliberate consideration.

When structural engineers tackle the field of dams in a large way, the results ought to be satisfactory to the steel producers. Their activity must be accompanied by well directed propaganda. Progress is bound to be slow, unless there is wholehearted and strong financial backing of the idea. Naturally the group directly interested is the fabricators, but the steel makers have an equally big stake. With the wider acceptance today of campaigns to court publicity for the products of a given industry, it will not be surprising soon to find the steel producers organized, as never before, as a business unit.

There is no point in discussing here the engineering aspects of dam construction. One knows they must be water-tight, that they must be anchored in the stream bed against sliding along the base, that they must extend well at the sides for anchorage and water-tightness, and that they must have a stability to prevent overturning under the pressure of the impounded water. With a steel dam, leakage can be quickly discovered and stopped. Accordingly faults would not be progressively developing without notice. As suggested, steel design is subject to precise calculation. Erection in out of the way places presents no new problem. All in all the steel dam may be offered as an ideal structure.

### Now Comes Farm Relief

**W**E may be sure that early in the present administration, not to say early in this year, something is going to be done (or even many things) for the farmers, but especially for the growers of corn and wheat. There is to be an upward revision of freight rates on mineral products so that they may be lowered on agricultural. There are going to be all sorts of tariff adjustments that can be conceived as favorable. It is even suggested that a tariff be put on bananas, not that there is a home industry to protect, but rather to increase the cost of bananas and divert people to bread as a cheaper starchy food. But the main thing is of course going to be some legislative measure, whereof the objective, more or less disguised, will be to raise the prices for farm products.

This can mean, and can be, nothing but some plan to withhold supplies from the market and by means of a "revolving fund" to carry them until consumers take them over. In other words, it will be a pool operation, with the Government, i. e., the tax payers, doing the financing.

If, however, the farmer gets more for his products it is a safe prophecy that collectively he will quickly produce more and that any revolving fund will soon

revolve itself out of existence. The townsfolk will do the paying through income taxes and otherwise. Even so it might be worth while to pacify the farmers if that would lead them to get rid of the blatherskites that they send to Congress, as well as to their State legislatures. In short, the attempt to satisfy the farming community may be well worth the effort even at a large expense and with doubts as to its success. When we consider that the farmers of Europe are discontented, just like the farmers of the United States, there is bound to be the suspicion that something in their own habits and the conduct of their business makes them so, not to speak of economic conditions which cannot be helped.

### Labor's Fear of Advancing Age

**E**MPLOYMENT managers today have made the age of applicants a more or less dominant factor in hiring men, other things being equal, depending upon the nature of the work to be done. The same factors governed the hiring of men a generation ago, when plants were much smaller. Then, there was seldom an employment office or employment manager; the hiring of men was attended to by the owner or by his superintendent or foremen. Sound health was to them just as important a consideration as it is today, though there was no physical examination to disclose hidden weaknesses. So also was age. Everything else being equal, the younger man got the job.

Labor might learn a lesson from this very fear of the effect of advancing years upon ability to get a job. The skilled man may be held immune from any age limit. Many thousands of such artisans are valued members of manufacturing organizations. Their places are not always easy to fill. If they have reasonably good health, they encounter little difficulty when they go seeking work. Organized labor's abhorrence of unrestricted apprentice training has stood in the way of many a man who today has no real trade, because the opportunity to learn one was not permitted him when he was a lad.

It is inevitable that the general run of common laborers should end their days of maximum usefulness almost before they enter upon middle life. Such men find difficulty in securing employment, except when the demand for labor exceeds the supply of younger applicants. Their usefulness depends not upon skill, but upon brawn and vigor.

In this age of highly specialized labor in industry, wherever modern manufacturing methods are in vogue, unskilled youth is often offered opportunity the like of which rarely came to his equally unskilled father. Such a man is taken out of the ranks of common labor and given some one task to perform, usually on a special or specially equipped machine. He is given intensive training until he becomes an expert. His is a narrow field, of course, often very narrow indeed. Yet he has risen a step in usefulness and in earning power. If he has native ability the chance is before him to make more of himself, perhaps to go far.

In this comparatively new field of advancement, age counts also. For, if young blood is to be had, no employer would encourage the selection of older men. The successful manufacturer demands that men be hired not only for immediate results but with a view to building up a strong organization for the future.



## CORRESPONDENCE

### Favors Stock Pile of Manganese Ore

*To the Editor:* A high tariff on manganese ore—one cent per pound of manganese content, or about 60 per cent ad valorem—has existed now for six years, during which domestic manganese ore mining has contributed a very small tonnage. Fifteen thousand tons of metallic manganese (about five per cent of United States consumption) is all that was delivered last year by domestic producers.

As far as the ferroalloy industry is concerned, it is safe to say that manganese ore mining in the United States does not exist, and, according to very authoritative and eminent mining men and geologists, it never will exist.

Under the name of manganese ore we are actually mining low grade ferruginous manganese ores, lending themselves to beneficiation with the greatest difficulty. This industry exists only because of the high tariff on imported high grade manganese ore; the day this duty is abolished, mining of lean manganiferous ores in the United States will stop.

It is evident that economically the duty on manganese ore is nonsense, and the only pro-tariff argument which should be considered is war-time emergency. To be able to make deliveries of manganese ores from deposits of lean hardly workable ferruginous manganese ore in time of war, it was decided to support "a knowingly lost cause," at a cost to the nation of about \$4,500,000 every year.

Whether a domestic manganese ore industry will be able to supply the necessary quantities of high quality manganese ore in case of war is very doubtful, and no one at the present time can give an assurance of that. Such assurance, however, does lie in another measure which is

prompted by both common sense and simple arithmetic.

As was recommended by a committee of the American Institute of Mining and Metallurgical Engineers in 1923, and later supported by the Secretary of War, the best provision for war emergency is the purchasing of 600,000 tons of high grade manganese ore and keeping it in stock. This stock, with the regular inventories at steel plants, may tide us over for more than two and one-half years.

Putting it in other words, the committee has suggested the creation within our borders of a "manganese ore mine" which will last for two years in case of emergency. Creation of such a mine, which will give a certain and not a probable service, will cost about \$11,000,000. Yearly interest on such investment amounts to \$600,000. As \$600,000 is less than the \$4,500,000 which is spent for duty on manganese ore and ferromanganese each year, it is clear that the suggestion of the Mining Institute's committee is more profitable to the country.

Besides, in such a case, domestic deposits of ferruginous manganese ores will be with us in case of emergency and not partially depleted, as they are going to be, if unprofitable domestic mining continues to be supported at the expense of the nation.

One question arises—who is going to finance the creation of this "manganese mine" within our borders? Being connected with the defense of the country, such a measure should be financed by the Government. But as the industry wishes the Government to "keep away from business," would it not be to the advantage of ferromanganese users if this financing would be done by the producers of ferromanganese, with the understanding that the expense of carrying the excess stocks will be borne by the commodity?

In this way this extra expense will be justly prorated, and the ultimate consumer of iron products will be far better off than now.

FEODORE F. FOSS,

Wheeling, W. Va.

Wheeling Steel Corporation

## Leaders to Address Foreign Trade Council

Secretary Lamont, Charles M. Schwab and Daniel Willard on Program—Mr. Farrell to Observe Anniversary

**M**AKING his first public address since assuming office, when he speaks on April 17 at the opening session of the sixteenth convention of the National Foreign Trade Council at Baltimore, Secretary of Commerce Robert P. Lamont will discuss "World Trade, Today and Tomorrow."

Other outstanding features of the convention just announced in the council's new program include addresses by Lawrence A. Downs, president of the Illinois Central System, who will speak on "World Trade Between the Americas," and Daniel Willard, president of the Baltimore & Ohio Railroad, whose topic is "The Railroads and Foreign Trade." The future of air transport for commerce will be discussed at the closing session by John S. Hambleton, vice-president of the Pan-American Airways.

The foreign traders' "family party," at a get-together dinner on the opening evening of the convention, will have as special guests Charles M. Schwab and Capt. Robert Dollar, both of whom will respond to the greetings of the foreign traders

by informal and intimate addresses. The spokesman for South America at the convention will be the Hon. Senor Don Carlos G. Davila, Chile's ambassador in the United States, who will speak on "Pan American Arbitration."

At the closing session, James A. Farrell, president of the United States Steel Corporation, will review "Foreign Trade Progress," surveying the country's achievements in foreign trade during the eventful period since the National Foreign Trade Council was founded on May 20, 1914. Mr. Farrell will observe the council's fifteenth anniversary and his own fifteenth term of service as its chairman at a dinner at Baltimore, at which more than 50 of the 93 members of the council plan to be present.

Other speakers include Lynn Meekins, United States commercial attaché at Ottawa, on "Some Special Features of Trading with Canada"; M. J. Falkenburg, president of the Falkenburg Trading Co., Seattle, on "Progress in the Far East"; Prof. Grover

G. Huebner, University of Pennsylvania, on "European Practice in Credit Insurance," and E. G. Simons, vice-president of the American Foreign Credit Corporation, on "Installation Selling for Export."

The American Management Association, 20 Vesey Street, New York, is cooperating with the American Society of Mechanical Engineers in suggesting to members the possibilities of conducting waste elimination weeks within their plants. A folder is available from the management association, explaining how certain companies, namely, the Westinghouse Electric & Mfg. Co., East Pittsburgh; the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., and the subsidiary companies of the United States Steel Corporation, have successfully conducted waste elimination weeks.

The Armstrong Cork Co., Pittsburgh, has announced the consolidation of the offices of all its divisions at Lancaster, Pa., effective April 1. The general office of the company and all executive offices of the Armstrong Cork Co., cork division, and of the Armstrong Cork & Insulation Co., with the exception of the purchasing department, will be removed from Pittsburgh.



# Tests for Electroplate on Aluminum

## British Institute of Metals Also Discusses Electric Furnace Practice As Applied to Non-Ferrous Work

(Special Correspondence)

LONDON, March 15.—The Institute of Metals, at its meeting this week, celebrated its twenty-first birthday, and the fulfilment of its ambition to attain a membership of 2000. Doubts entertained in 1908 as to whether the addition of another technical association to the already long list would be justified have vanished before the record of solid achievement.

It is characteristic of the general attitude of the Institute of Metals that its first president—the late Sir William White—was not a non-ferrous metallurgist, but a great naval constructor, representing the users of non-ferrous metals. He was succeeded by the late Sir Gerard Muntz, a manufacturer of non-ferrous metals, and he, in turn, by the late Professor W. Gowland, a distinguished scientific metallurgist. This order of rotation in filling the presidential chair has been followed—with but few exceptions. It serves to emphasize the fact that the institute seeks to serve the interests of all those directly concerned with the non-ferrous metals, whether as manufacturers, as users, or as scientific investigators or teachers of metallurgy.

From the report of the council it is evident that the institute enters its third decade with every prospect of increased usefulness to the sciences and industries which it serves. Of its 2003 members, one-third are from overseas. Arrangements are being made for the next autumn meeting to be held in Düsseldorf, Germany, Sept. 9 to 12, by invitation of the Verein Deutscher Ingenieure and of the Deutsche Gesellschaft für Metallkunde. It is planned to visit America in 1932.

### Testing of Electro-Deposits on Aluminum

G. B. Brook and G. H. Stott (British Aluminium Co.) gave an account of investigations on commercial electroplated surfaces on aluminum. Most of these were finished in nickel, the commonest metal used. The paper is not concerned with the actual plating of the material, but is confined to the development of tests to indicate the stability of the deposit.

Given good conditions, it is not difficult to obtain a smooth, continuous coating of the usual deposited metals on aluminum. Close examination discloses no surface defect even after months. In course of time, however, a microscopical blister makes its appearance, favored by a concave shape (e. g., the bowl of a spoon). These blisters grow in size and number, small blisters coalesce to form larger ones, until a few months later the whole deposit can be stripped away with the fingernail. This hitherto

inherent difficulty has been ascribed to one of two causes (perhaps operating together):

(a) Inability to insure an oxide-free surface when the first film of deposited metal was "struck," or

(b) Porosity of deposit, leading to undermining and loosening of the metallic film.

The evidence, then, of blister on any plated aluminum sheet must always entail its rejection.

In the course of years, deposits of an apparently satisfactory nature have been put upon the market by various commercial concerns, but no tests for deposits of the ordinary thickness have been published which would show, even relatively, the merits of such electroplating, and, in particular, the behavior and durability after long-time exposure.

Tests proposed by the authors are of four varieties: (a) measured thickness, (b) porosity under microscope, (c) adhesion after twisting around a ½-in. bar and (d) corrosion in brackish water at half-tide for three months.

Some of the specimens examined withstood the tests excellently, others failed completely.

Discussion centered on the details of corrosion testing, and the matter was summed up by the president, Walter Rosenhain, with the statement that scientists had as yet been unable to devise a standard laboratory test for corrosion which would do better than establish broad distinctions in the corrosion resistance of metals.

### Electric Furnaces in Non-Ferrous Duty

In a French works very large Ajax-Wyatt furnaces are used for brass melting, scrap being charged and metal poured at frequent intervals, the furnace being used as a metal mixer to overcome slight irregularities in composition of the scrap, but this system of working is now giving way to intermittent working in smaller units, in the opinion of D. F. Campbell, consulting engineer, London. In all countries the system of pouring the whole charge except an amount necessary to maintain the secondary circuit is generally adopted. The 600 or 1200-lb. units are then preferred. The larger furnace has the advantage of a 10-per cent reduction in electric current used for melting, and a substantial reduction in labor costs, especially when casting large slabs in water-cooled molds or heavy extrusion billets. When casting small billets, generally used in England for the cold-rolling of brass strip, the smaller 600-lb. unit is usually to be preferred.

The Ajax-Northrup high-frequency or "wireless" furnace has advanced

rapidly during the last two years. The largest unit built in England has 1-ton capacity operated by a 650-kw. motor-generator set. The principle of a coreless induction furnace is also being applied to normal frequencies, and the melting in this way presents no great difficulties.

Electrical heat treatment is frequently an economic choice. The author cited a recent installation of furnaces with chambers 8 x 8 x 2 ft., to operate at 500 to 900 deg. C. Cost of operation may be divided as follows:

(a) Heat required to warm the furnace from cold, which is an occasional expenditure. This utilized 35s. worth of electric energy against an estimated cost of 24s. 8d. for gas, showing a balance in favor of the gas furnace for this item.

(b) The constant cost of maintaining the heat losses. The cost of maintaining the electric furnace at temperature under working conditions was 30 units per hour, costing 1s. 9d. whereas the cost of gas to maintain temperature was 6s. 7d. per hour. This shows a very large saving in the annual fuel bill.

(c) The cost of heating up the metallic charge. The energy actually used to heat the charge is equal in both cases in quantity, but the cost of the calorific value is cheaper in the case of gas.

On a year's operation the saving on item (b) in favor of the electric furnace is greater than the difference in favor of the gas furnace under the first and last headings, and thus electric heating is justified, both on account of cost and also an improved quality of product, due to accurate heat regulation.

Collateral advantages frequently warrant the installation of equipment even at an apparently higher unit cost. Thus the author compares annealing furnaces heated with electricity and gas. It has been found that electric heating gives a more even film of oxide, owing to the regularity of temperature. Consequently, light pickling requiring only a fraction of the time previously necessary, leaves a uniformly bright surface without the stains which occurred with gas-heating. One furnace annealing 63:37 brass, with a chamber 3 ft. 3 in. wide, treats 5 tons per 24 hr. of strip 0.019 in. thick. This output is increased substantially when annealing metal containing 67 per cent of copper. The working temperature is 700 deg. C. and the power consumption varies from 155 to 200 units per ton. The rating of such a furnace is 60 to 100 kw., the latter power only being used when heating up the furnace after the weekend.

The Whiting Corporation, Harvey, Ill., maker of cranes, foundry equipment and railroad specialties, on March 22, had operated its plant for 59 days without a single lost time accident. The plant employs 600 men and women.

# March Total Iron Output Second Largest

Daily Rate Ranks Third and Was 4.6 Per Cent Over February—Largest First Quarter—Net Gain of 5 Furnaces

WITH all producing furnaces heard from, data gathered by wire on April 2 show that the March pig iron production was 119,822 gross tons per day. This is the largest daily rate since June, 1923, when it was 122,548 tons. It is the third largest on record, the peak having been 124,764 tons per day in May, 1923. The March daily rate of 119,822 tons is 5315 tons per day or 4.6 per cent larger than the 114,507 tons in February. The gain in February over January was 3.1 per cent. A year ago the March daily rate was 103,215 tons, making the March rate this year 16.1 per cent higher.

Total March pig iron output was

3,714,473 tons. Only one previous month ever reached 3,700,000 tons—May, 1923, at 3,867,694 tons.

The total for the first quarter of this year is 10,362,028 tons, the largest for any first quarter. The nearest approach for that period was 10,148,726 tons in the first quarter of 1925. The largest quarter on record was 11,093,875 tons for the second quarter of 1923, the record pig iron year.

## Operating Rate Active on April 1

There were 212 furnaces active on April 1 with an estimated operating rate on that day of 120,740 tons per day. This compares with 115,770 tons per day for the 207 furnaces blowing

on March 1. In March nine furnaces blew in and four were shut down, a net increase of five, the same as in February.

Of the nine furnaces blown in during March four were Steel Corporation stacks, four belonged to independent steel companies and one was a merchant furnace. Four Steel Corporation furnaces were blown out. Thus there was a net gain of four steel-making and one merchant stack.

## Gain in Steel-Making, Loss in Merchant Iron

Last month steel-making iron increased decidedly over February, while merchant decreased. At 95,461

Daily Average Production of Coke Pig Iron in the United States by Months Since Jan. 1, 1925—Gross Tons

	1925	1926	1927	1928	1929
Jan. ....	108,720	106,974	100,123	92,573	111,044
Feb. ....	114,791	104,408	105,024	100,004	114,507
Mar. ....	114,975	111,032	112,366	103,215	119,822
Apr. ....	108,632	115,004	114,074	106,183	.....
May ....	94,542	112,304	109,385	105,931	.....
June ....	89,115	107,844	102,988	102,733	.....
½ year...	105,039	109,660	107,351	101,763	.....
July ....	85,936	103,978	95,199	99,091	.....
Aug. ....	87,241	103,241	95,073	101,180	.....
Sept. ....	90,873	104,543	92,498	102,077	.....
Oct. ....	97,528	107,553	89,810	108,832	.....
Nov. ....	100,767	107,890	88,279	110,084	.....
Dec. ....	104,853	99,712	86,960	108,705	.....
Year ....	99,735	107,043	99,266	103,382	.....

Pig Iron Production by Districts, Gross Tons

	March (31 days)	February (28 days)	January (31 days)	December (31 days)
New York and Mass. ....	259,771	219,940	231,511	201,594
Lehigh Valley .....	96,978	85,686	94,285	87,479
Schuylkill Valley .....	71,002	55,843	51,532	63,984
Lower Susq. and Lebanon Valleys .....	34,490	31,403	33,576	33,666
Pittsburgh district .....	779,013	655,405	717,088	719,542
Shenango Valley .....	134,854	115,619	112,709	99,478
Western Pennsylvania .....	153,483	135,767	148,098	152,890
Maryland, Va. and Ky. ....	110,748	87,889	98,366	98,750
Wheeling district .....	146,546	129,082	145,943	131,813
Mahoning Valley .....	372,329	331,653	346,603	329,973
Central and North'n Ohio .....	326,677	303,770	338,616	343,959
Southern Ohio .....	47,600	40,351	48,110	43,370
Illinois and Indiana .....	790,784	666,236	674,037	657,387
Mich., Minn., Mo., Wis., Colo. and Utah .....	134,987	130,649	143,873	150,737
Alabama .....	249,079	211,061	252,468	249,142
Tennessee .....	6,132	5,831	5,555	6,082
Total .....	3,714,473	3,206,185	3,442,370	3,369,846

Total .....

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works Iron	Merchant Iron*	Total
March, 1928 .....	83,489	19,726	103,215
April .....	85,183	21,000	106,183
May .....	85,576	20,355	105,931
June .....	81,630	21,103	102,733
July .....	79,513	19,578	99,091
August .....	82,642	18,538	101,180
September .....	82,590	19,487	102,077
October .....	88,051	20,781	108,832
November .....	88,474	21,610	110,084
December .....	85,415	23,290	108,705
January, 1929 .....	85,530	25,514	111,044
February .....	89,246	25,261	114,507
March .....	95,461	24,361	119,822

\*Includes pig iron made for the market by steel companies.

Coke Furnaces in Blast

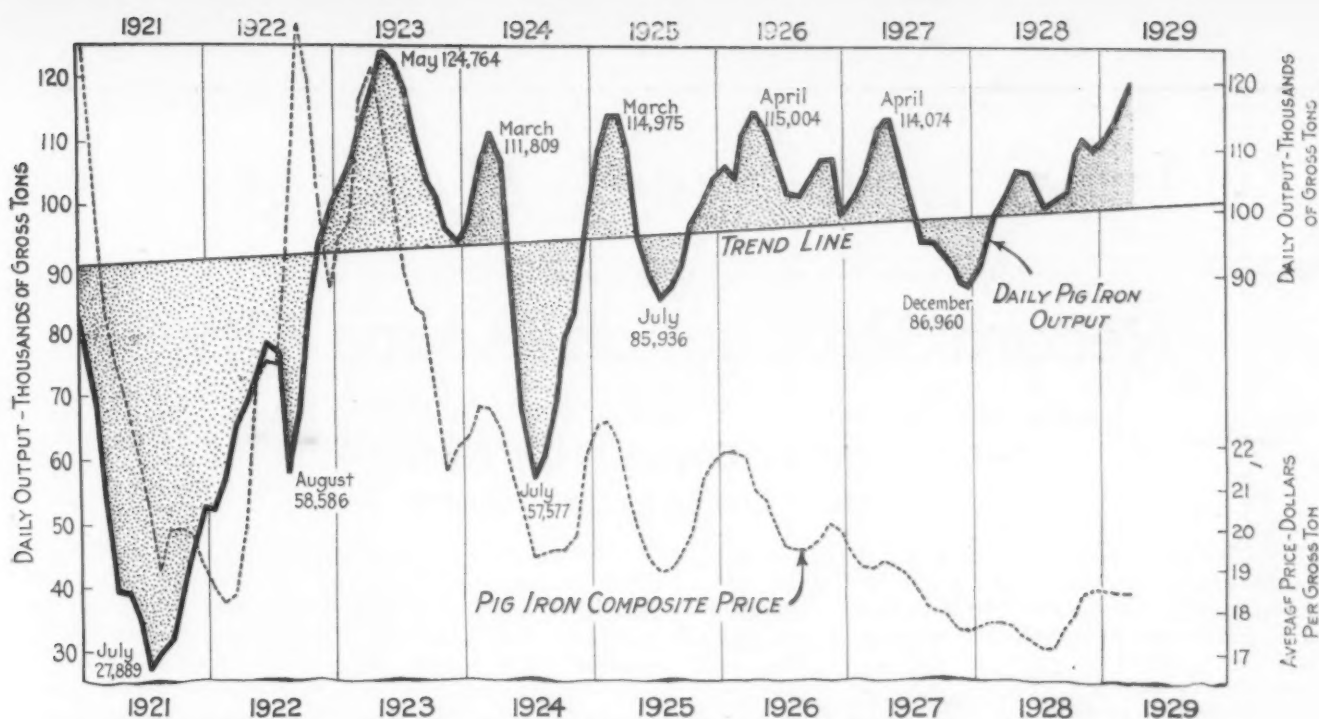
	April 1		March 1	
	Number in Blast	Gross Tons per Day	Number in Blast	Gross Tons per Day
New York:				
Buffalo .....	14	7,400	13	6,770
Other N. Y. and Mass. ....	3	1,080	3	1,090
New Jersey .....	0	.....	0	.....
Pennsylvania:				
Lehigh Valley .....	7	3,125	7	3,160*
Schuylkill Valley .....	5	2,290	5	2,190
Susquehanna Valley .....	2	1,110	2	1,120
Ferromanganese .....	0	.....	0	.....
Lebanon Valley .....	0	.....	0	.....
Ferromanganese .....	0	.....	0	.....
Pittsburgh District .....	38	25,065	36	23,285
Ferromanganese and Spiegel .....	3	555*	3	570*
Shenango Valley .....	8	4,350	8	4,415
Western Pennsylvania .....	9	4,925	8	3,980
Ferromanganese .....	2	290	2	400
Maryland .....	6	3,110	5	2,665
Wheeling District .....	8	4,725	8	4,610
Ohio:				
Mahoning Valley .....	21	12,525	20	11,845
Central and Northern .....	17	10,310	18	10,850
Southern .....	3	1,535	3	1,065
Illinois and Indiana .....	36	25,510	36	24,970
Mich., Wis. and Minn. ....	6	2,715	5	2,280
Colo., Mo. and Utah .....	4	2,040	4	1,985
The South:				
Virginia .....	0	.....	0	.....
Ferromanganese and Spiegel .....	1	105*	1	95
Kentucky .....	1	350	1	375
Alabama .....	17	7,430	18	7,840
Ferromanganese .....	0	.....	0	.....
Tennessee .....	1	195	1	210
Total .....	212	120,740	207	115,770

\*Includes spiegeleisen.

Production of Coke Pig Iron in United States by Months Beginning Jan. 1, 1927—Gross Tons

	1927	1928	1929
Jan. ....	3,103,820	2,869,761	3,442,370
Feb. ....	2,940,679	2,900,126	3,206,185
Mar. ....	3,483,362	3,199,674	3,714,473
3 mos. ....	9,487,861	8,969,561	10,362,028
Apr. ....	3,422,226	3,185,504	.....
May ....	3,390,940	3,283,856	.....
June ....	3,089,651	3,082,000	.....
½ year .....	19,430,678	18,520,921	.....
July .....	2,951,160	3,071,824	.....
Aug. ....	2,947,276	3,136,570	.....
Sept. ....	2,774,949	3,062,314	.....
Oct. ....	2,784,112	3,373,806	.....
Nov. ....	2,648,376	3,302,523	.....
Dec. ....	2,695,755	3,369,846	.....
Year* .....	36,232,306	37,837,804	.....

\*These totals do not include charcoal pig iron. The 1928 production of this iron was 142,960 gross tons.



The High Production of Pig Iron in March Represented an Average Output per Furnace of 570 Tons  
Inclined line represents the gradually increasing theoretical needs of the country, ascertained by a balancing of the ups and downs in production. It shows an average yearly increase in consumption of about 423,000 tons

tons per day steel-making iron exceeded February by 6215 tons or 6.9 per cent. Merchant iron at 24,361 per day last month was 900 tons less than in February.

#### Ferromanganese and Spiegel Output

Ferromanganese output in March was 24,978 tons or less than in either January or February. The average per month for the first quarter of 26,388 tons compares with 26,000 tons per month in 1928. The spiegeleisen output of three producers in March was 13,001 tons.

#### Bethlehem and Carnegie Stacks Active

Of the 33 furnaces of the Bethlehem Steel Corporation, 28 were blowing on April 1. Of the 47 furnaces owned by the Carnegie Steel Co., 33 were making iron the first of

this month. In the Chicago district 34 furnaces were active out of 41 on April 1.

#### Possibly Active Stacks Reduced

The Bay View furnaces of the Illinois Steel Co. at Milwaukee and the Milton furnace in southern Ohio have recently been abandoned. The Crumwold stack in the Lehigh Valley, formerly owned by the Reading Iron Co., which was sold late last year to the H. Sofransky Co., Allentown, Pa., dealer in scrap iron and steel, has been resold to the Pennebacker Co., Emaus, Pa., and may again be operated. Likewise, the Allen's Creek furnace of the Tennessee Products Corporation in Tennessee, which had been practically abandoned, has been reconditioned and may again be operated. Thus the number of possibly

active stacks in the United States has been reduced from 320 to 319.

#### Furnaces Blown In and Out

During March the following furnaces were blown in: One Lackawanna stack of the Bethlehem Steel Co. in the Buffalo district; one Duquesne and one Edgar Thomson furnace of the Carnegie Steel Co. in the Pittsburgh district; one Cambria furnace of the Bethlehem Steel Co. in western Pennsylvania; one Sparrows Point furnace of the Bethlehem Steel Co. in Maryland; one Brier Hill stack of the Youngstown Sheet & Tube Co. in the Mahoning Valley; one South Chicago furnace of the Illinois Steel Co. in the Chicago district; one Detroit stack of the M. A. Hanna Co. in Michigan, and one Bessemer furnace of the Tennessee Coal, Iron & Railroad Co. in Alabama.

The following furnaces were blown out or banked during the month: One Lorain stack of the National Tube Co. in northern Ohio; one South Chicago furnace of the Illinois Steel Co. in the Chicago district, and two Ensley stacks of the Tennessee Coal, Iron & Railroad Co. in Alabama.

Production of Steel Companies for Own Use—Gross Tons

	Total Pig Iron Spiegel and Ferromanganese			Ferromanganese*		
	1927	1928	1929	1927	1928	1929
Jan. ....	2,343,881	2,155,133	2,651,416	31,844	22,298	28,208
Feb. ....	2,256,651	2,274,880	2,498,901	24,560	19,320	25,978
Mar. ....	2,675,417	2,588,158	2,959,295	27,834	27,912	24,978
3 mos. ....	7,275,949	7,018,171	8,109,612	84,238	69,530	79,164
Apr. ....	2,637,919	2,555,500	.....	24,735	18,405	.....
May ....	2,619,078	2,652,872	.....	28,734	29,940	.....
June ....	2,343,409	2,448,905	.....	29,232	32,088	.....
½ year. ....	14,876,355	14,675,448	.....	166,939	149,963	.....
July ....	2,163,101	2,464,896	.....	26,394	32,909	.....
Aug. ....	2,213,815	2,561,904	.....	21,279	24,583	.....
Sept. ....	2,090,200	2,477,695	.....	20,675	22,278	.....
Oct. ....	2,076,722	2,729,589	.....	17,710	23,939	.....
Nov. ....	1,938,043	2,654,211	.....	17,851	29,773	.....
Dec. ....	1,987,652	2,647,863	.....	20,992	28,618	.....
Year ....	27,345,888	30,211,606	.....	291,840	312,061	.....

\*Includes output of merchant furnaces.

Dominion Alloy Steel Corporation, Sarnia, Ont., has plans for an extensive plant improvement program. Company intends to install equipment for the processing of black sheets, so as to enable it to turn out about 15,000 tons of black sheets per year in addition to galvanized and corrugated sheets now produced.



# Iron and Steel Markets

## Record Production Keeps Up

Operations Undiminished Following Peak Quarter in Steel  
Output and Second Largest Total in Pig Iron—  
Consumers in Market for Third Quarter

**F**OLLOWING a record-breaking quarter, iron and steel production shows no sign of declining. Delivery promises are still extending on certain products and there has been little relaxing of pressure for shipments.

Demand is well diversified, reflecting a high general level of activity in consuming industries. With buyers already trying to contract for third quarter requirements in some materials, the outlook is darkened only by the fear of a general collapse of the securities markets.

Pig iron production in the past three months, at 10,363,028 tons, was the highest for any first quarter and the second largest for any quarter, having been exceeded only by the output for April, May and June, 1923. Production in March, according to blast furnace returns to THE IRON AGE, was 3,714,473 tons, or 119,822 tons a day, the second largest monthly total and the third highest daily rate.

Steel ingot output in March undoubtedly established a new monthly record, and production for the first quarter surpassed the previous high mark, reached in the last three months of 1928, by at least 300,000 tons.

While undiminished demand from the automobile industry is contributing in a large way to the pressure on producers, railroad buying, pipe line awards and structural steel lettings have been features of the week's developments. Orders for 5000 freight cars raise the total bought by domestic roads since Jan. 1 to 43,000, compared with 51,000 for all of 1928. Three pipe line contracts call for 195,000 tons of steel, and structural steel awards, at 84,000 tons, are the largest for any week thus far this year.

Sheets and strips have established new high quarterly records in sales, production and shipments. The motor car industry has given strong support to the demand for these products, as well as for bars. Although the spring peak in automobile output is believed to be approaching, signs of a letdown in requirements, which are usually felt by the mills four to six weeks in advance, are still lacking.

A leading independent sheet producer had the largest unfilled orders in history on April 1, and, with all of its mills operating at 100 per cent of capacity, has some units scheduled through the entire second quarter. The concern of buyers over deliveries is reflected in efforts to place contracts for third quarter and in increasing drafts on warehouse steel. Sheet mills, in turn, find their output restricted by the supply of semi-finished steel. Offers of premiums for sheet bars for prompt delivery have been unsuccessful because of the heavy forward commitments of producers.

The extent to which consumers have departed from a hand-to-mouth buying policy is also indicated by their readiness to place specifications against second-quarter contracts despite the large shipments of first-quarter steel still to be made. Second-quarter shipping orders have established the advances in hot-rolled bars, shapes, plates, cold-finished bars and hot-rolled strip. In sheets, notwithstanding large total bookings, first-quarter prices on some finishes have not disappeared.

A desire to protect third-quarter supplies is also becoming manifest in the pig iron market. At Cleveland, where the week's sales of malleable and foundry grades totaled 63,000 tons, a moderate volume of third-quarter business was taken at existing prices.

Northern and Eastern producers are in a strong position; at Chicago, sales and shipments of the first three months of the year were the highest in history. Alabama furnaces, on the other hand, have large unsold stocks and Southern melters, as a rule, have enough iron to carry them through April. Although Southern iron is being pressed for sale in Northern markets, in some cases at concessions from the recently reduced price. Northern melters are largely under contract for their needs in the current quarter.

Purchases of Lake Superior iron ore by open market buyers and commitments by consumers having long term contracts average about 10 per cent larger than last year.

Heavy melting scrap has advanced 50c. at Philadelphia and 25c. a ton at Pittsburgh and Chicago. Furnace coke at Connellsville has declined 5c. a ton to \$2.85.

Of the week's pipe line orders, a gas line from Monroe, La., to St. Louis calls for 115,000 tons of large diameter pipe, divided between a Pittsburgh mill and a Milwaukee fabricator, and 25,000 tons of small pipe for feeder lines. The Milwaukee interest also took an order for 35,000 tons, while a Pittsburgh company booked 20,000 tons of 10-in. pipe for a Southwestern oil line.

Pig iron production in March by steel company furnaces increased 6.9 per cent, while output by merchant plants declined 3.6 per cent. Eight steel works stacks and one merchant furnace were blown in and four steel company units were blown out, making a net gain of five active stacks. The operating rate of the 212 furnaces in blast April 1 was 120,740 tons a day, compared with 115,770 tons a day one month previous.

Both of THE IRON AGE composite prices have advanced, pig iron from \$18.38 to \$18.46 a ton and finished steel from 2.391c. to 2.412c. a lb.

# A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous,  
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Apr. 2, 1929	Mar. 26, 1929	Mar. 5, 1929	Apr. 3, 1928
No. 2 foundry, Philadelphia..	\$21.76	\$21.76	\$21.26	\$20.76
No. 2, Valley furnace.....	18.00	18.00	17.50	17.25
No. 2, Southern, Cin'ti.....	19.19	19.19	20.19	19.69
No. 2, Birmingham.....	15.50	15.50	16.50	16.00
No. 2 foundry, Chicago*.....	20.00	20.00	20.00	18.50
Basic, del'd eastern Pa.....	20.25	20.25	20.25	19.50
Basic, Valley furnace.....	17.50	17.50	17.50	17.00
Valley Bessemer, del'd P'gh..	20.26	20.26	20.01	19.26
Malleable, Chicago*.....	20.00	20.00	20.00	18.50
Malleable, Valley.....	18.50	18.50	18.00	17.25
Gray forge, Pittsburgh.....	19.26	19.26	18.76	18.51
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace....	105.00	105.00	105.00	100.00

Rails, Billets, Etc., Per Gross Ton:	Apr. 2, 1929	Mar. 26, 1929	Mar. 5, 1929	Apr. 3, 1928
Rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh..	34.00	34.00	34.00	33.00
Sheet bars, Pittsburgh.....	35.00	35.00	35.00	34.00
Slabs, Pittsburgh.....	34.00	34.00	34.00	33.00
Forging billets, Pittsburgh...	39.00	39.00	39.00	38.00
Wire rods, Pittsburgh.....	42.00	42.00	42.00	44.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	1.85	1.85	1.85	1.85

Finished Steel,	Apr. 2, 1929	Mar. 26, 1929	Mar. 5, 1929	Apr. 3, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.95	1.90	1.90	1.85
Bars, Chicago.....	2.05	2.05	2.05	2.00
Bars, Cleveland.....	1.95	1.95	1.90	1.85
Bars, New York.....	2.20	2.24	2.24	2.19
Tank plates, Pittsburgh.....	1.95	1.90	1.90	1.85
Tank plates, Chicago.....	2.05	2.05	2.05	2.00
Tank plates, New York.....	2.22 1/2	2.17 1/2	2.17 1/2	2.17 1/2
Structural shapes, Pittsburgh	1.95	1.90	1.90	1.85
Structural shapes, Chicago...	2.05	2.05	2.05	2.00
Structural shapes, New York...	2.19 1/2	2.14 1/2	2.14 1/2	2.14 1/2
Cold-finished bars, Pittsburgh	2.30	2.20	2.30	2.20
Hot-rolled strips, Pittsburgh...	1.90	1.80	1.80	2.10
Cold-rolled strips, Pittsburgh...	2.75	2.75	2.85	3.00

\*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Finished Steel,	Apr. 2, 1929	Mar. 26, 1929	Mar. 5, 1929	Apr. 3, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh...	2.85	2.85	2.85	2.85
Sheets, black, No. 24, Chicago	3.05	3.05	3.05	3.00
dist. mill.....	3.60	3.60	3.60	3.65
Sheets, galv., No. 24, P'gh...	3.80	3.80	3.80	3.85
Sheets, galv., No. 24, Chicago	2.10	2.10	2.10	2.10
dist. mill.....	2.30	2.30	2.30	2.20
Wire nails, Pittsburgh.....	2.65	2.65	2.65	2.65
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.70
Plain wire, Pittsburgh.....	2.50	2.50	2.50	2.50
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.55
Barbed wire, galv., P'gh.....	3.30	3.30	3.30	3.35
Barbed wire, galv., Chicago	3.35	3.35	3.35	3.40
dist. mill.....	\$5.35	\$5.35	\$5.35	\$5.25
Tin plate, 100 lb. box, P'gh..				

Old Material, Per Gross Ton:	Apr. 2, 1929	Mar. 26, 1929	Mar. 5, 1929	Apr. 3, 1928
Heavy melting steel, P'gh....	\$18.75	\$18.50	\$18.50	\$15.00
Heavy melting steel, Phila....	17.00	16.50	16.00	13.50
Heavy melting steel, Ch'go....	16.00	15.75	15.50	12.50
Carwheels, Chicago.....	14.50	14.50	14.50	13.50
Carwheels, Philadelphia.....	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh.....	15.50	15.25	15.00	14.50
No. 1 cast, Philadelphia.....	16.50	16.00	16.50	16.00
No. 1 cast, Ch'go (net ton)...	16.00	16.00	16.00	14.50
No. 1 RR. wrot., Phila.....	16.00	16.00	16.00	15.00
No. 1 RR. wrot., Ch'go (net)	14.00	14.00	14.00	11.00

Coke, Connellsville, Per Net Ton at Oven:	Apr. 2, 1929	Mar. 26, 1929	Mar. 5, 1929	Apr. 3, 1928
Furnace coke, prompt.....	\$2.85	\$2.90	\$3.10	\$2.60
Foundry coke, prompt.....	3.75	3.75	3.75	3.75

Metals,	Apr. 2, 1929	Mar. 26, 1929	Mar. 5, 1929	Apr. 3, 1928
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	24.12 1/2	24.12 1/2	19.62 1/2	14.30
Electrolytic copper, refinery..	23.75	23.75	19.25	14.12 1/2
Tin (Straits), New York.....	48.50	48.75	48.75	53.50
Zinc, East St. Louis.....	6.80	6.60	6.35	5.72 1/2
Zinc, New York.....	7.15	6.95	6.70	6.07 1/2
Lead, St. Louis.....	7.65	7.65	7.05	5.95
Lead, New York.....	7.75	7.75	7.10	6.10
Antimony (Asiatic), N. Y. ..	9.62 1/2	9.75	9.12 1/2	9.50

## Pittsburgh

### Steel Industry Has Greatest Quarter in Its History— Automobile Demands Greatest Factor—Prices Stronger

PITTSBURGH, April 2.—The steel industry has completed the greatest quarter in its history. Ingot production has left all former record performances for such a period very much behind. The principal urge to heavy steel production and shipments has been provided by the automotive industry. Not only has there been the enlarged production schedule of the Ford Motor Co., but the exportation of automobiles, which is reported to have been double that of the same period last year, brooked no delays if the builders were to have full advantage of the selling season abroad. Introduction of new models also has contributed to the demands for steel.

The motor car industry has been largely responsible for the large volume of business in sheets, strips and bars. In the first two products, the report is common that sales, production and shipments all established new high record marks for a three months' period.

Rail business, though slightly less than that of a year ago, has taken a good deal of crude steel in the quarter just ended. Tin plate has been another important outlet, with production and shipments fully 10 per cent ahead of the first quarter of last year. Structural steel has not done

so well in this district, but on a nation-wide basis has helped to swell ingot production.

Interest now centers in the second quarter and its prospects. The momentum created by the first quarter's activity should carry the industry through another month at the present high rate of productive activity, which is calling for substantially full engagement of open-hearth furnaces. Mills are booked even farther ahead in sheets and strips, but a month is as far as it is now possible to see clearly. It is believed that the spring automobile manufacturing pe-

riod is at or near its crest. Any let-down in motor car output will begin to be reflected in the demand for steel some four to six weeks in advance, since such periods are required between the rolling of the steel and its assembly in the cars. Dropping off in automobile demands also would have the effect of taking the edge off the general demand, since it has been from that quarter that the urgency for supplies has been greatest.

Rail shipments are drafts upon order books, as little fresh buying is likely between now and next fall. There is not much likelihood of any considerable tin plate buying supplementary to existing contracts and sheet buyers appear to be covered for some time to come. Wire can be counted on to do better, but aside from line pipe and pipe for building and construction, pipe business is dull, and the situation is such as to create doubts about early betterment.

Steel makers are taking a firmer stand on prices, but heavy bookings seem to stand in the way of early realization of the higher quotations.

The scrap market is a two-sided affair. Against the fact that dealers are paying premiums for available



supplies for some consuming points is the development that at other points the needs are less urgent than recently. There is a feeling among dealers that this is a good time to make some short sales.

The pig iron market is quiet, with no change in prices. Fuel prices tend lower under small demands.

**Pig Iron.**—One Valley furnace interest reports sales during the past week of 2000 tons of foundry iron in lots of from a carload to 400 tons, but it is doubtful if the sales of other producers in that district totaled more than 2000 tons additional. A Pittsburgh user of malleable iron bought 1000 tons from a western Pennsylvania furnace at somewhat under the Valley furnace price of \$18.50. No important tonnages of basic iron were included in the week's business. In Bessemer iron, the sales have been usually of small lots. Large users appear covered for the second quarter, or for most of it, and the others seem to be disposed to cover their needs as they arise. Basic iron still waits a real test at the price now quoted by Valley furnaces, but the recent advance in other grades is finding some basis in sales, which, though individually small, come with fair regularity. The melt by sanitary ware, radiator and steel foundries is good.

Prices per gross ton, f.o.b. Valley furnace:	
Basic .....	\$17.50 to \$18.00
Bessemer .....	18.50
Gray forge .....	17.50
No. 2 foundry .....	18.00
No. 3 foundry .....	17.50
Malleable .....	18.50
Low phos., copper free....	26.50 to 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

**Semi-Finished Steel.**—There are still no supplies beyond the requirements of producers for their own finishing mills and those of their regular contract customers, and prices consequently are very firm, although it probably will be a few weeks before non-integrated mills will be specifying on second quarter contracts and thus paying the higher prices named for this period. Specifications were accepted to the end of March at the first quarter contract price. Actual billings at the higher prices have been made in a few cases where it was necessary for non-integrated mills to sup-

#### Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates .....	3.00c.
Structural shapes .....	3.00c.
Soft steel bars and small shapes...	2.90c.
Reinforcing steel bars.....	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons.....	3.60c.
Squares and flats .....	4.10c.
Bands .....	3.25c.
Hoops .....	4.25c.
Black sheets (No. 24), 25 or more bundles .....	3.80c.
Galv. sheets (No. 24), 25 or more bundles .....	4.55c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets .....	3.45c.
Galv. corrug. sheets (No. 28), per square .....	\$4.43
Spikes, large .....	3.40c.
Small .....	3.80c. to 5.25c.
Boat .....	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb. \$3.50	
Wire, black soft ann'l'd, base per 100 lb. ....	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb. ....	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

plement supplies from their regular source. A manufacturer of flat steel, ordinarily self-contained, was a recent buyer of sheet bars because of a blooming mill accident which caused a three-day suspension. Skelp is easy to get at 1.85c. Wire rods are having a good movement at \$42, base Pittsburgh or Cleveland.

**Bars, Plates and Shapes.**—Bar specifications were heavy the past week, and mills in this area are well committed for the next 30 days and mention three to four weeks as the best possible delivery on new business. On fresh commitments mills generally are quoting 1.95c., base Pittsburgh, but buyers are too well covered at less to be interested in additional supplies at the moment, and there are not yet many specifications on second quarter contracts. The plate outlook is improved by the fact that there is a possibility that 2000 of the 4500 cars recently distributed by the New York Central Lines will be built in local shops, and that almost half of the steel for the gas pipe line from Monroe, La., to St. Louis, requiring 140,000 tons of trunk line and feeders will be rolled in Pitts-

burgh. Structural steel lettings to local shops remain rather light. A test of higher asking prices on structural shapes and plates still is a few weeks off, as consumers still have protection on first quarter commitments.

**Rails and Track Supplies.**—Track laying, which has been reasonably active for the past 90 days, has been speeded up with the arrival of mild weather, and a good movement of standard-section rails and of spikes, bolts and tie-plates is a natural sequence. Light-section rails are only moderately active, but prices of billet rails are holding, though there is some shading of prices on rerolled rails.

**Wire Products.**—Shipments of wire products, with the exception of nails, are showing a seasonal gain. The movement of nails still suffers from the fact that distributors stocked heavily before the advance on first quarter contracts became effective, and the shipments into consumption have not been sufficiently large to necessitate replenishment.

**Tubular Goods.**—The much-mentioned line to convey natural gas from the Monroe, La., field to St. Louis, taking 110,000 tons of 22-in. pipe for the main line and 40,000 tons of smaller sizes for feeder lines, has been closed. The large diameter pipe will be largely supplied by the A. O. Smith Corporation, Milwaukee, which has taken 325 miles out of a total of 554, the remainder and the feeder lines going to the National Tube Co. For an oil line in the Southwest, taking 200 miles of 10-in. pipe, or between 20,000 and 25,000 tons, a local mill was the successful bidder. The oil production curtailment program is beginning to affect demand for seamless casing, which, while still relatively good, is not as active as it was a short time ago. Lapwelded pipe for oil and gas wells is sluggish. Butt welded pipe is growing more active as spring building and construction work gains momentum. Tubing business continues good.

**Sheets.**—With order books amounting to two to three months' full engagement of mill capacity, mills are beginning to take a firmer stand on prices. While 2.85c., base Pittsburgh, for black, 3.60c., base, for galvanized,

### THE IRON AGE Composite Prices

#### Finished Steel

April 2, 1929, 2.412c. a Lb.

One week ago.....	2.391c.
One month ago.....	2.391c.
One year ago.....	2.357c.
10-year pre-war average.....	1.689c.

Based on steel bars, beams, tank plates, wire, nails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low
1929	2.412c., Apr. 2:	2.391c., Jan. 8	
1928	2.391c., Dec. 11:	2.314c., Jan. 3	
1927	2.453c., Jan. 4:	2.293c., Oct. 25	
1926	2.453c., Jan. 5:	2.403c., May 18	
1925	2.560c., Jan. 6:	2.396c., Aug. 18	

#### Pig Iron

April 2, 1929, \$18.46 a Gross Ton

One week ago.....	\$18.38
One month ago.....	18.38
One year ago.....	17.67
10-year pre-war average.....	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low
1929	\$18.46, Jan. 8:	\$18.29, Mar. 19	
1928	18.59, Nov. 27:	17.04, July 24	
1927	19.71, Jan. 4:	17.54, Nov. 1	
1926	21.54, Jan. 5:	19.46, July 13	
1925	22.50, Jan. 13:	18.96, July 7	



# Mill Prices of Finished Iron and Steel Products

## Iron and Steel Bars Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.95c. to 2.05c.
F.o.b. Chicago.....	2.05c. to 2.15c.
Del'd Philadelphia.....	2.27c. to 2.37c.
Del'd New York.....	2.29c. to 2.39c.
Del'd Cleveland.....	1.97½c. to 2.00c.
F.o.b. Cleveland.....	1.95c. to 2.00c.
F.o.b. Lackawanna.....	2.05c. to 2.15c.
F.o.b. Birmingham.....	2.15c. to 2.20c.
C.i.f. Pacific ports.....	2.35c. to 2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

	Base per Lb.
F.o.b. Pittsburgh mills, 40, 50, 60-ft.....	2.00c.
F.o.b. Pittsburgh mills, cut lengths.....	2.25c.
F.o.b. Birmingham, mill lengths.....	2.15c.

	Base per Lb.
F.o.b. mills, east of Chicago dist.....	1.85c.
F.o.b. Chicago Heights mill.....	1.95c.

	Base per Lb.
Common iron, f.o.b. Chicago.....	2.05c. to 2.10c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

## Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.95c. to 2.05c.
F.o.b. Chicago.....	2.05c. to 2.15c.
F.o.b. Birmingham.....	2.15c. to 2.20c.
Del'd Cleveland.....	2.14c.
Del'd Philadelphia.....	2.15c. to 2.25c.
F.o.b. Coatesville.....	2.05c. to 2.15c.
F.o.b. Sparrow Point.....	2.05c. to 2.15c.
F.o.b. Lackawanna.....	2.05c. to 2.15c.
Del'd New York.....	2.22½c. to 2.32½c.
C.i.f. Pacific ports.....	2.20c. to 2.30c.

## Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.95c. to 2.05c.
F.o.b. Chicago.....	2.05c. to 2.15c.
F.o.b. Birmingham.....	2.15c. to 2.20c.
F.o.b. Lackawanna.....	2.05c. to 2.15c.
F.o.b. Bethlehem.....	2.05c. to 2.15c.
Del'd Cleveland.....	2.14c.
Del'd Philadelphia.....	2.01c. to 2.06c.
Del'd New York.....	2.14½c. to 2.24½c.
C.i.f. Pacific ports.....	2.35c.

## Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh.....	2.00c.
Wider than 6 in., P'gh.....	1.90c.
6 in. and narrower, Chicago.....	2.20c.
Wider than 6 in., Chicago.....	2.10c.
Cooperage stock, P'gh.....	2.20c.
Cooperage stock, Chicago.....	2.30c.

## Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill.....	2.30c.
Bars, f.o.b. Chicago.....	2.30c.
Bars, Cleveland.....	2.35c.
Shafting, ground, f.o.b. mill.....	*2.65c. to 3.60c.
Strips, P'gh.....	2.75c. to 2.85c.
Strips, Cleveland.....	2.75c. to 2.85c.
Strips, del'd Chicago.....	3.05c. to 3.15c.
Strips, Worcester.....	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pitts- burgh or Cleveland.....	4.25c. to 4.35c.

\*According to size.

## Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Ken
Wire nails.....	\$2.65 to \$2.75
Galvanized nails.....	4.65 to 4.75
Galvanized staples.....	3.35 to 3.45
Polished staples.....	3.10 to 3.20
Cement coated nails.....	2.65 to 2.75

	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage.....	\$2.50 to \$2.60
Annealed fence wire.....	2.65 to 2.75
Spring wire.....	3.50 to 3.60
Gal'd wire, No. 9.....	3.10 to 3.20
Barbed wire, gal'd.....	3.30 to 3.40
Barbed wire, painted.....	3.05 to 3.15
Woven wire fence (per net ton to retailers).....	65.00
Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Bir- mingham mill prices \$3 a ton higher; Worcester, Mass., (wire) mill \$3 a ton higher on produc- tion of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.	

## Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or North- umberland, Pa.....	\$2.70
Less carloads, Wheeling or Reading.....	2.80

## Sheets

### Blue Annealed

	Base per Lb.
Nos. 9 and 10, f.o.b. P'gh.....	2.10c. to 2.20c.
Nos. 9 and 10, f.o.b. Chicago dist.....	2.30c.
Nos. 9 and 10, del'd Cleveland.....	2.29c. to 2.39c.
Nos. 9 and 10, del'd Philadelphia.....	2.42c. to 2.52c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.25c. to 2.35c.

	Base per Lb.
No. 24, f.o.b. Pittsburgh.....	2.85c. to 2.95c.
No. 24, f.o.b. Chicago dist. mill.....	3.05c.
No. 24, del'd Cleveland.....	3.04c. to 3.14c.
No. 24, del'd Philadelphia.....	3.17c. to 3.27c.
No. 24, f.o.b. Birmingham.....	3.00c. to 3.10c.

	Base per Lb.
No. 24, f.o.b. P'gh, No. 1 grade.....	4.00c. to 4.10c.
No. 24, f.o.b. P'gh, No. 2 grade.....	3.80c. to 3.90c.

	Base per Lb.
No. 24, f.o.b. Pittsburgh.....	3.60c. to 3.70c.
No. 24, f.o.b. Chicago dist. mill.....	3.80c.
No. 24, del'd Cleveland.....	3.79c. to 3.89c.
No. 24, del'd Philadelphia.....	3.92c. to 4.02c.
No. 24, f.o.b. Birmingham.....	3.75c. to 3.85c.

	Base per Lb.
No. 28, f.o.b. Pittsburgh.....	3.00c.
No. 28, f.o.b. Chicago dist. mill.....	3.10c.

	Base per Lb.
No. 20, f.o.b. Pittsburgh.....	4.10c.

	Base per Lb.
No. 24, 8-lb. coating, f.o.b. mill.....	4.00c.

	Base per Lb.
No. 24, f.o.b. Pittsburgh.....	3.90c.

## Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills.....	\$5.35
Standard cokes, f.o.b. Gary.....	5.45

## Terne Plate

	Base per Box
8-lb. coating I.C.\$11.20 125-lb. coating I.C.\$16.70	
15-lb. coating I.C. 14.00 30-lb. coating I.C. 17.75	
20-lb. coating I.C. 15.30 40-lb. coating I.C. 19.85	

## Alloy Steel Bars

	Per Base Box
Standard cokes, f.o.b. P'gh district mills.....	\$5.35
Standard cokes, f.o.b. Gary.....	5.45

	Per Base Box
Standard cokes, f.o.b. P'gh district mills.....	\$5.35
Standard cokes, f.o.b. Gary.....	5.45

	Per Base Box
Standard cokes, f.o.b. P'gh district mills.....	\$5.35
Standard cokes, f.o.b. Gary.....	5.45

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Standard cokes, f.o.b. Gary.....	5.45

	Per Base Box
Standard cokes, f.o.b. P'gh district mills.....	\$5.35
Standard cokes, f.o.b. Gary.....	5.45

	Per Base Box
Standard cokes, f.o.b. P'gh district mills.....	\$5.35
Standard cokes, f.o.b. Gary.....	5.45

	Per Base Box
Standard cokes, f.o.b. P'gh district mills.....	\$5.35
Standard cokes, f.o.b. Gary.....	5.45

	Per Base Box
Standard cokes, f.o.b. P'gh district mills.....	\$5.35
Standard cokes, f.o.b. Gary.....	5.45

	Per Base Box
Standard cokes, f.o.b. P'gh district mills.....	\$5.35
Standard cokes, f.o.b. Gary.....	5.45

	Per Base Box
Standard cokes, f.o.b. P'gh district mills.....	\$5.35
Standard cokes, f.o.b. Gary.....	5.45

Angle bars.....	\$2.75
Track bolts, to steam railroads.....	\$3.80 to \$4.00
Track bolts, to jobbers, all sizes, per 100 count.....	70 per cent off list

## Welded Pipe

Base Discounts, f.o.b. Pittsburgh District  
and Lorain, Ohio, Mills

Steel			Butt Weld			Iron		
Inches	Black	Galv.	Inches	Black	Galv.	Inches	Black	Galv.
1/4 .....	45	19 1/2	1/4 and 3/8 .....	+11	+36	1/4 .....	23	8
1/2 to 3/8 ..	51	25 1/2	1/2 .....	28	11	1 and 1 1/4 ..	31	16
1/2 .....	56	42 1/2	3/4 .....	31	18	1 1/2 and 2 ..	35	18
3/4 .....	60	48 1/2	1 and 1 1/4 ..	31	16			
1 to 3 .....	62	50 1/2	1 1/2 and 2 ..	35	18			

		Lap	Weld		
2 .....	55	43½	2 .....	23	9
2½ to 6 .....	59	47½	2½ to 3½ .....	28	13
7 and 8 .....	56	43½	4 to 6 ....	30	17
9 and 10 .....	54	42½	7 and 8 .....	29	16
11 and 12 .....	53	40½	9 to 12 .....	26	11

Butt Weld, extra			strong, plain ends		
1/4 .....	41	24 1/2	1/4 and 3/8 .....	+13	+48
1/2 to 3/8 ..	47	30 1/2	1/2 .....	23	7
3/4 .....	53	42 1/2	3/4 .....	28	12
1 .....	58	47 1/2	1 to 2 ....	34	18
1 to 1 1/2 ..	60	49 1/2			
2 to 3 ....	61	50 1/2			

Lap Weld, extra strong, plain ends					
2 .....	53	42½	2 .....	29	13
2½ to 4 .....	57	46½	2½ to 4 .....	34	20
4½ to 6 .....	56	45½	4½ to 6 .....	33	19
7 to 8 .....	52	39½	7 and 8 .....	31	17
9 and 10 .....	45	32½	9 to 12 .....	21	8

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 8 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

## Boiler Tubes

	Base Discounts, f.o.b. Pittsburgh
Steel	Charcoal Iron
2 in. and 2 1/4 in.. 40	1 1/2 in. .... 1
2 1/2 in.—2 3/4 in.. 48	1 3/4 in. .... 8
3 in. .... 54	2 in.—2 1/4 in. .... 13
3 1/4 in.—3 3/4 in.. 56	2 1/4 in.—2 3/4 in.. 16
4 in. .... 59	3 in. .... 17
4 1/2 in. to 6 in.. 48	3 1/4 in. to 3 3/4 in.. 18
	4 in. .... 20
	4 1/2 in. .... 21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts: Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

## Standard Commercial Seamless Boiler Tubes

	Cold Drawn
1 in. .... 63	3 in. .... 48
1 1/4 to 1 1/2 in.. 55	3 1/4 to 3 1/2 in.. 50
1 3/4 in. .... 39	4 in. .... 53
2 to 2 1/4 in.. 34	4 1/2, 5 and 6 in.. 42
2 1/2 to 2 3/4 in.. 42	

	Hot Rolled
2 and 2 1/4 in.. 40	3 1/4 to 3 1/2 in.. 56
2 1/2 and 2 3/4 in.. 48	4 in. .... 59
3 in. .... 54	4 1/2, 5 and 6 in.. 48

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb. base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

## Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads).....	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse dis- counts on small lots are less than the above.	

and 2.10c., base, for blue annealed have not yet disappeared, more producers now are quoting the full second quarter prices than was true a week ago. The momentum of mill operations still is strong, with all capacity working, except that idle for repairs or because of insufficient supplies of sheet bars. There were generous additions to unfilled orders last month in spite of record production and shipments.

**Tin Plate.**—Production continues at 90 per cent of capacity or higher, makers being well supplied with contract specifications. Mill engagement of some manufacturers is under 90 per cent of the number of mills, but several of the independent companies are working one or two extra turns each week, which makes good the loss in idle mills. The American Sheet & Tin Plate Co. has decided to abandon its Sabraton works at Morgantown, W. Va., a 10-mill unit, which has become a high cost plant on account of its distance from a steel supply. The company has recently abandoned its Crescent works in Cleveland, a six-mill plant. LaBelle works at Wheeling, W. Va., one of 10 mills, and Pittsburgh works, New Kensington, Pa., one of eight mills. But the losses have been more than made good by the increased capacity at the Gary plant, which, through the employment of the continuous mills for breaking-down operations, now is rated as a 72-mill plant, although it has only 24 double mills or 48 single mills. When all mills are supplied by continuous mills, it will become a 96-mill plant.

**Cold-Finished Steel Bars and Shafting.**—Last Saturday wound up the acceptance of specifications or shipping orders on first quarter contracts, and producers expect that shipments against them will be completed before the end of this month. There is a fair amount of specifying on second quarter contracts carrying 2.30c., base Pittsburgh, and makers are becoming more confident of the full establishment of that figure, which represents an advance of \$2 a ton over the first quarter base.

**Hot-Rolled Strips.**—While it will be some time before consumers of strips will find it necessary to specify on second quarter contracts, producers are so well obligated that they are not interested in fresh business at less than 1.90c., base, on stock 6 in. to 24 in. and 2c., base, for the narrow widths. Some mills are not promising delivery of new purchases before the first week of June. Makers also are sold well ahead on bands and cooperage stock and are quoting full prices on new business.

**Cold-Rolled Strips.**—It probably will be the end of this month before local producers will have completed shipments on first quarter contracts, but recent business includes a fair amount of second quarter contract tonnage, which, while not carrying a higher base price than in the first quarter, nets makers more money through the new card of extras, which now is in general force.

**Coke and Coal.**—Spot furnace coke continues to soften in price. Demand has dwindled a little more rapidly than production could be curtailed and lately sales have been at \$2.85 to \$2.90, or 10c. to 15c. below the prices of two weeks ago. Foundry coke also is plentiful for spot shipment, and it is believed that even the minimum quotation would be shaded on a worthwhile tonnage. A drop of almost 33 per cent in soft coal production from the recent peak reflects the coal situation fully. Prices remain very much in buyers' favor.

**Old Material.**—No important consumer buying of the steel works grades of scrap has been done in the past week, but the continued high engagement of open-hearth capacity creates added pressure for supplies. Therefore, dealers who recently sold are active buyers. As offerings of heavy melting steel are scant, they find it necessary to pay \$18.50 to \$19 for supplies in transit. Cars of compressed sheets that can be moved quickly to consumers are bringing as much as heavy melting steel and both grades are quotable at \$18.50 to \$19 on dealer short covering. It is said that heavy melting steel is so scarce that, if a round lot were wanted by a consumer for fairly early shipment, the price would not be less than \$19.50. The general market is firm and quotably higher on most grades than a week ago. The April

scrap list of the Baltimore & Ohio Railroad contains 9315 gross tons, including 3000 tons of No. 1 rails and 1200 tons of No. 1 heavy melting steel. The Norfolk & Western list has 5724 gross tons.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	\$18.50 to \$19.00
No. 2 heavy melting steel	16.75 to 17.75
Scrap rails	18.25 to 18.75
Compressed sheet steel	18.50 to 19.00
Bundled sheets, sides and ends	17.00 to 17.50
Cast iron carwheels	16.25 to 16.75
Sheet bar crops, ordinary	19.00
Heavy breakable cast	13.50 to 14.00
No. 2 railroad wrought	18.50 to 19.00
Hvy. steel axle turnings	16.50 to 17.50
Machine shop turnings	11.00 to 11.50
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	22.00 to 22.50
Railr. coil and leaf springs	22.00 to 22.50
Rolled steel wheels	22.00 to 22.50
Low phos. billet and bloom ends	23.50 to 24.00
Low phos., mill plates	22.00 to 22.50
Low phos., light grades	21.50 to 22.00
Low phos., sheet bar crops	22.50 to 23.00
Heavy steel axle turnings	16.50 to 17.50
Electric Furnace Grades:	
Low phos., punchings	21.50 to 22.00
Hvy. steel axle turnings	16.50 to 17.50
Blast Furnace Grades:	
Short shoveling steel turnings	12.50 to 13.00
Short mixed borings and turnings	12.50 to 13.00
Cast iron borings	12.50 to 13.00
Rolling Mill Grades:	
Steel car axles	21.00 to 22.00
No. 1 railroad wrought	14.50 to 15.50
Sheet bar crops	20.50 to 21.00
Cupola Grades:	
No. 1 cast	15.50 to 16.00
Rails 3 ft. and under	21.00 to 21.50

## Railroads to Continue Export Freight Rate

WASHINGTON, April 2.—Eastern railroads have just filed a tariff with the Interstate Commerce Commission continuing in effect from June 30 to the end of the present year reduced rates on iron and steel products for export through Atlantic ports. These reduced rates, being 20 per cent under domestic rates, were put into effect provisionally last year and by reason of stimulation they gave to iron and steel exports have been maintained ever since. The Pittsburgh-New York rate is 25c. per 100 lb. The tariff calls for a minimum carload weight of 45,000 lb.

## Sharp Increase in Imports of Iron Ore in February

WASHINGTON, March 29.—Imports of iron ore in February increased to 240,934 gross tons from 180,308 tons in January. For the first two months

of the year they declined to 421,242 tons, from 480,756 tons for the corresponding period of 1928. Chile held the lead by providing 152,791 tons in February and 236,242 tons during the two months, while supplies from Cuba totaled 64,000 tons and 103,000 tons respectively.

## Large Antimony Imports Last Year

WASHINGTON, March 29.—China shipped 7562 gross tons of antimony regulus, 1395 tons of antimony oxide and 515 tons of crude antimony to the United States in 1928, compared with 7031 tons of regulus, 611 tons of oxide and 825 tons of crude in the preceding year, according to the Department of Commerce. The 1928 shipments formed about 71 per cent of the total United States imports of antimony metal, and also represented approximately 54 per cent of China's exports of that commodity and 39 per cent of its total production.

SOURCES OF AMERICAN IMPORTS OF IRON ORE  
(In Gross Tons)

	February		Two Months Ended February	
	1929	1928	1929	1928
Canada	24	36,270	146	38,628
Cuba	64,000	33,500	103,000	47,500
Chile	152,791	121,300	236,242	272,100
Spain	5,960	5,000	18,348	5,000
Sweden	7,080	.....	13,728	.....
French Africa	5,580	28,656	30,680	92,331
Other countries	4,499	4,852	19,098	25,197
Total	240,934	229,578	421,242	480,756



# Semi-Finished Steel, Raw Materials, Bolts and Rivets

## Mill Prices of Semi-Finished Steel

### Billets and Blooms

	Per Gross Ton
Rerolling, 4 in. and under 10 in., Pittsburgh	\$34.00
Rerolling, 4 in. and under 10 in., Youngstown	34.00
Rerolling, 4 in. and under 10 in., Cleveland	35.00
Rerolling, 4 in. and under 10 in., Chicago	35.00
Forging quality, Pittsburgh	39.00

### Sheet Bars

	Per Gross Ton
(Open Hearth or Bessemer)	
Pittsburgh	\$35.00
Youngstown	35.00
Cleveland	35.00

### Slabs

	Per Gross Ton
(8 in. x 2 in. and under 10 in. x 10 in.)	
Pittsburgh	\$34.00
Youngstown	34.00
Cleveland	34.00

### Skelp

	Per Lb.
(F.o.b. Pittsburgh or Youngstown)	
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

### Wire Rods

	Per Gross Ton
(Common soft, base)	
Pittsburgh	\$42.00
Cleveland	42.00
Chicago	43.00

## Prices of Raw Material

### Ores

	Per Gross Ton
Lake Superior Ores, Delivered Lower Lake Ports	
Old range Bessemer, 51.50% iron	\$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40
Foreign Ore, c.i.f. Philadelphia or Baltimore	
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	10.00c.
Iron ore, low phos., Swedish, average 68% iron	10.00c.
Iron ore, basic Swedish, average 65% iron	9.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	33.00c. to 35.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	33.00c. to 35.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$12.00 to \$12.50
Chrome ore, 45 to 50% Cr <sub>2</sub> O <sub>3</sub> , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
Molybdenum ore, 85% concentrates of MoS <sub>2</sub> , delivered	50c. to 55c.

### Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

### Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	\$31.00 to \$34.00
Domestic, 16 to 19%	29.00 to 32.00

### Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$83.50
75%	130.00
	Per Gross Ton Furnace
10%	\$35.00
11%	37.00
	Per Gross Ton Furnace
12%	\$39.00
14 to 16%	45.00

### Bessemer Ferrosilicon

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
10%	\$31.00
11%	33.00
	Per Gross Ton
12%	\$35.00

### Silvery Iron

	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
6%	\$24.00
7%	25.00
8%	26.00
9%	27.00
	Per Gross Ton
10%	\$29.00
11%	31.00
12%	33.00

### Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	98c. to \$1.05
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace	\$3.15 to \$3.65
Ferrocobaltitium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	\$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Roekdale, Tenn., base, per gross ton	\$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	\$122.50

### Fluxes and Refractories

#### Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	\$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	\$18.00 to 19.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silica, f.o.b. Illinois and Kentucky mines	32.50

#### Fire Clay Brick

	Per 1000 f.o.b. Works
High-Heat Duty Brick	
Intermediate Heat Duty Brick	
Pennsylvania	\$43.00 to \$46.00 \$35.00 to \$38.00
Maryland	43.00 to 46.00 35.00 to 38.00
New Jersey	50.00 to 65.00
Ohio	43.00 to 46.00 35.00 to 38.00
Kentucky	43.00 to 46.00 35.00 to 38.00
Missouri	43.00 to 46.00 35.00 to 38.00
Illinois	43.00 to 46.00 35.00 to 38.00
Ground fire clay, per ton	7.00

#### Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$48.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	\$8.50 to 10.00

#### Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

#### Chrome Brick

	Per Net Ton
Standard size	\$45.00

### Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.85 to \$2.90
Foundry, f.o.b. Connellsville prompt	3.75 to 4.85
Foundry, by-product, Chgo ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

### Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.25 to \$1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, 1/4-in., f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

## Mill Prices of Bolts, Nuts, Rivets and Set Screws

### Bolts and Nuts

	Per 100 Pieces
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	
Machine bolts	70
Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

\*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including 1 1/2 in. x 6 in. take 10 per cent lower list prices.

### Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	70
Semi-finished hexagons castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10, 5 and 2 1/2
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2 1/2
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2 1/2
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

### Large Rivets

	Base per 100 Lb.
(1/4-In. and Larger)	
F.o.b. Pittsburgh or Cleveland	\$2.90 to \$3.10
F.o.b. Chicago	3.00 to 3.20

### Small Rivets

	Per Cent Off List
(1/8-In. and Smaller)	
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

### Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70



# Chicago

## Steel Mills Operating at Capacity—100,000 Tons in Recent Welded Pipe Orders

CHICAGO, April 2.—The Milwaukee welded pipe manufacturer has taken about 62,000 tons of 22-in. pipe for a gas line from the Louisiana fields to St. Louis. This, with 35,000 tons for another pipe line, brings the total nearly to 100,000 tons of steel pipe placed with that fabricator in the last 10 days. March and the first quarter of the year have established records in many phases of the local iron and steel market. Shipments of steel mill products and merchant pig iron were the heaviest on record. Sales of pig iron to foundries in this territory also register a new high mark. Specifications for finished steel products for the past week were 50 per cent larger than those of the average week last year, and sales were the third largest so far this year. In some quarters a drop in new business is expected for the reason that most large users are now under cover for the next three months.

The building industry still drags, though pending lists give hope for betterment. Car builders are swinging into heavier production, but progress is slow, and the bulk of steel needed for car contracts is still to be ordered from mills. Steel output is at capacity in most departments.

**Pig Iron.**—March shipments of merchant pig iron are a record for all time. Sales in the month also were unusually heavy as a result of the covering for the second quarter. A few melters have made commitments for the third quarter, and some buyers have made known their needs for July and August. Sales in the opening days of April are light, being confined largely to fill-in tonnages and orders entered by users who do not place contracts for stated periods. Release orders for the early part of April bulk large, and there is no indication of a letdown in the rate of shipping, which is slightly in excess of pig iron production. Stocks in the hands of producers in Chicago and at St. Louis are low, and there is no evidence that melters are accumulating iron. Pressure for delivery is severe. Many foundries in this district are complaining of the lack of skilled labor, a condition which is tending to curtail output consistent with orders in hand.

### Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25...	\$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75...	20.50
Malleable, not over 2.25 sil. ....	20.00
High phosphorus.....	20.00
Lake Super. charcoal, sil. 1.50.....	27.04
So'th'n No. 2 fdy. (all rail).....	21.51
Low phos., sil. 1 to 2, copper free..	29.50
Silvery, sil. 8 per cent.....	30.79
Bess. ferrosilicon, 14-15 per cent...	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

**Ferroalloys.**—Shipments of these commodities in the first quarter and in March have established records. Specifications for deliveries in April are heavy. Sales are quiet.

**Prices delivered Chicago:** 80 per cent ferromanganese, \$112.56; 50 per cent ferrosilicon, \$83.50 to \$88.50; spiegel-eisen, 19 to 21 per cent, \$40.76.

**Cast Iron Pipe.**—Sales in March were measurably below the expectations of sellers, and inquiry now before the trade gives little promise of an expansion in orders. Among inquir-

ies is one for 985 tons of 12-in. Class B pipe, on which Chicago will receive tenders April 9. Marcus Thompson is low bidder on the general contract for laying 650 tons of 6, 8 and 12-in. pipe for Park Ridge, Ill., and the Union Construction Co. was successful bidder on a sewage system that will require 125 tons at De Kalb, Ill. A sewage disposal plant at Grand Rapids, Mich., will take 300 tons, and Columbus, Ohio, will buy 1300 tons. Akron, Ohio, has taken bids on 75 tons of fittings, 2700 tons of 4, 10 and 36-in. and 1200 tons of 6, 8 and 10-in. pipe. James B. Clow & Sons have taken 180 tons of 12-in. Class B pipe for Holland, Mich., at \$38 a ton, Birmingham. The cast iron pipe market is moderately active in Wisconsin. Oshkosh will buy 180 tons of 6-in., and Neenah has ordered 100 tons of 4, 12 and 16-in. Class C pipe. Carload orders are numerous in Indiana and Illinois.

**Hot-Rolled Strip.**—Mills are operating at capacity and specifications are heavier than shipments. Prices are firm at 2c. to 2.20c. per lb., Chicago.

**Prices per net ton, deliv'd Chicago:** Water pipe, 6-in. and over, \$44.20 to \$46.20; 4-in., \$48.20 to \$50.20; Class A and gas pipe, \$3 extra.

**Rails and Track Supplies.**—A railroad serving the territory between Chicago and New York has ordered 14,000 tons of track supplies for its second quarter needs. Otherwise, sales of these commodities are small. Inquiries are scattered and light. Iron tie plate mills are scheduled to May 15 at capacity output. Secondary buying in standard-section rails totals 4000 tons by two Western railroads.

**Prices f.o.b. mill, per gross ton:** Standard section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. Per lb.: Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

**Sheets.**—Prices, which have been unsteady in the Northwest, now appear to be more stable. Quotations are 3.10c. per lb. in Chicago for black sheets, 3.85c. for galvanized and 2.35c. for blue annealed. Specifications are lighter than in the previous week, but they are fully equal to shipments, and, as a result, deliveries remain at four to six weeks. Spot buying is active, and forward contracting is more in evidence than in recent weeks. The jobbing trade is issuing larger speci-

fications as distribution through that channel expands. Hot mill operations are nearly at capacity, the governing factor in this being supplies of sheet bars rather than the current needs of users.

**Base prices per lb., deliv'd from mill in Chicago:** No. 24 black sheets, 3.10c.; No. 24 galv., 3.85c.; No. 10 blue ann'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

**Bars.**—Shipments of mild steel bars are at mill capacity, and specifications are measurably larger than output. Practically all consumers of this commodity are operating at capacity. Several contracts have been placed for expansion of agricultural machinery manufacturing plants and others are contemplated. While added facilities are being provided, these users continue to take steel in proportion to their full rated capacities. Spot sales of alloy steel bars are numerous. Orders entered at mills are heavier than output and deliveries now are not better than four weeks on a few grades, while six weeks governs on most specifications. Prices for rail steel bars remain firm at 1.95c., Chicago Heights. Specifications are growing larger, and deliveries have been extended to three weeks on the average. Chicago district rail steel bar mills are operating double turn.

**Plates.**—Orders are being placed with mills for 35,000 tons of plates needed for a pipe contract placed with a Western fabricator. Shipments of steel for pipe remain at the high rate of recent weeks. Orders for tank plates total 12,000 tons, 4000 tons of which is for delivery at the new refinery at East Chicago, Ind., and the remainder, which is in two lots, will be shipped to the Southern oil fields. An oil producer in the near Southwest is in the market for 2000 tons of plates for storage tanks. Specifications for steel from car builders were light this week, but the tonnages booked against car orders are large and releases may be expected to expand as soon as car shops can make further progress in arranging construction programs. About 45,000 tons of steel will be needed by Western shops for cars placed by Eastern and Western railroads. The Northern Pacific has ordered 500 gondolas, and it is estimated here that 3000 of the 4500 cars contracted for by the New York Central will be built in shops near Chicago. Total specifications for plates again bulk large, and mill schedules are no less heavy than a week ago. Prices are firm at 2.05c. to 2.15c., Chicago.

**Mill prices on plates, per lb.:** 2.05c. to 2.15c. base, Chicago.

**Wire Products.**—Sales and shipments of wire and wire products in March established a record for the third month of the year. The bulk of the tonnage moved went to the manufacturing trade. Jobbers, who normally should take large quantities at this time of the year, have been seriously handicapped by weather conditions and in some instances they

had stocks which proved to be too large, especially in view of the fact that demand has not been as active as was expected. In the Middle West and in the Northwest, country roads are easily passable, but in the South floods are seriously interfering with distribution. This is especially felt in woven wire fencing and in nails, both of which normally move rapidly at this time of the year. For the country as a whole, nail shipments are somewhat heavier. Shipments of reinforced concrete mesh grew steadily through March, and inquiries at hand indicate a continued active demand this month.

**Structural Material.**—Structural awards total more than 6000 tons, including 1900 tons for an addition to a pipe plant in Milwaukee. Specifications are heavier from fabricators in this and nearby districts, but it is significant that most of the current releases are not against new work, which is small for this time of the year, but against contracts taken earlier in the year. It is reported here that in the East, at Cleveland, at Denver and on the Pacific Coast building construction and structural awards are on a par with a year ago, but this cannot be said of Chicago, where there is a dearth of building projects which can be financed. The result is that local fabricators, though fairly well supplied with work, are anxious to take more contracts to assure satisfactory operations during the next two months. Competition is unusually keen, and fabricated steel prices are weak. The railroads have little increase in bridge work, though this is the season when such construction usually expands.

Mill prices on plain material, per lb.: 2.05c. to 2.15c. base, Chicago.

**Old Material.**—Activity in the heavy tonnage grades is confined to dealer trading, whereas consumers of specialties are openly in the market for needed car lots. Heavy melting steel is firm at \$16.25 a gross ton, delivered to consumers' yards. Bidding is active on railroad lists and high prices are obtained. The Chicago & North Western received the equivalent

of \$16.75 a ton, delivered, for a 600-ton lot of heavy melting steel. The supply of this grade appears to be a trifle freer, and brokers are having less difficulty in meeting the needs of consumers. Although the demand for hydraulic compressed sheets is heavy, tonnages appearing on track are ample. Yard operators and brokers alike appear to have little interest in the speculative side of the market. Few sellers have been able to make up their minds as to the trend of the market in the near future. For this reason brokers move with caution and yards are shipping scrap as it is prepared. Yard scrap piles are small. Producers are inclined to ship scrap as it is made rather than to hold it for possible higher prices. Foundries catering to the building industry appear to be busier. Included among offerings by the railroads are blank lists by the New York Central and the Michigan Central and 2000 tons by the Big Four.

Prices deliv'd Chicago district consumers:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel.....	\$16.00 to \$16.50
Shoveling steel.....	15.75 to 16.25
Frogs, switches and guards, cut apart, and misc. rails	16.75 to 17.25
Hydraul. compressed sheets	14.50 to 15.00
Drop forge flashings.....	12.00 to 13.00
Forg'd cast and r'd steel carwheels.....	19.00 to 19.50
Rail'd tires, charg. box size.....	19.00 to 19.50
Rail'd leaf spring cut apart.....	19.00 to 19.50
Acid Open-Hearth Grades:	
Steel couplers and knuckles	17.00 to 17.50
Coil springs.....	19.50 to 20.00
Electric Furnace Grades:	
Axle turnings.....	16.00 to 16.50
Los phos. punchings.....	17.50 to 18.00
Low phos. plate, 12 in. and under.....	17.50 to 18.00
Blast Furnace Grades:	
Axle turnings.....	11.25 to 11.75
Cast iron borings.....	10.00 to 10.50
Short shoveling turnings.....	10.00 to 10.50
Machine shop turnings.....	7.50 to 8.00
Rolling Mill Grades:	
Iron rails.....	16.00 to 16.50
Rerolling rails.....	17.50 to 18.00
Cupola Grades:	
Steel rails less than 3 ft.....	19.00 to 19.50
Steel rails less than 2 ft.....	20.00 to 20.50
Angle bars, steel.....	17.50 to 18.00
Cast iron carwheels.....	14.50 to 15.00
Malleable Grades:	
Railroad.....	19.50 to 20.00
Agricultural.....	16.50 to 17.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.....	26.00 to 31.00

#### Warehouse Prices, f.o.b. Chicago

Base per Lb.	
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.35c. to 2.40c.
Reinforc'g bars, rail steel.....	2.00c. to 2.05c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands (½ in. in Nos. 10 and 12 gages).....	3.20c.
Hoops (No. 14 gage and lighter).....	3.75c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'l'd sheets (No. 10).....	3.35c.
Spikes, stand. railroad.....	3.55c.
Track bolts.....	4.55c.
Rivets, structural.....	3.80c.
Rivets, boiler.....	3.80c.
Per Cent Off List	
Machine bolts.....	60
Carriage bolts.....	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank.....	60
Hot-pressed nuts, hex., tap. or blank.....	60
No. 8 black ann'l'd wire, per 100 lb.....	\$3.30
Com. wire nails, base per keg.....	3.20
Cement c't'd nails, base per keg.....	3.20

75 per cent of capacity. Second quarter contracting is virtually at an end. Prices are firm. Tillage machinery manufacturers are going into a seasonal decline in production, and specifications now entered by them are for delivery after July 1. Output of other types of farm machinery is at capacity.

**Coke.**—Prices of by-product foundry coke are firm at \$8 a ton, local ovens. Shipments are undiminished. All ovens in this district are lighted.

**Reinforcing Bars.**—The question of prices for reinforcing bars is foremost in the minds of buyers and sellers. Warehouses have named 2.40c. per lb. for billet steel bars in carloads and larger lots. Outstanding quotations at 2.35c. were to have been withdrawn April 1. Uneasiness has been caused, however, by cut prices on a few contracts. The rail steel reinforcing bar market shows less strength than a week ago. Most business is placed at 2c. and 2.05c. per lb., but some orders are being taken at less. Awards are more numerous, and inquiry is at the high point of the year. March shipments show a decided improvement over those in February.

## World's Largest Hangar To Be Built at Akron

The world's largest hangar will be built at Akron, Ohio, by the Goodyear-Zeppelin Corporation to house the two gigantic airships to be constructed by that company for the United States Navy. The building will be 1200 ft. long, 360 ft. wide and 200 ft. high and will have an unobstructed floor area of 389,000 sq. ft., enough to house six miles of freight cars. It will cost \$2,500,000.

Not only will it be the largest hangar in the world, but it will also be one of the world's largest buildings without pillars or posts to hold it up. The United States airplane carriers Saratoga and Lexington, the two largest ships afloat, could rest without their masts side by side in the hangar, and the Washington Monument and the Statue of Liberty could lie alongside and still there would be room.

One of the features of the hangar will be the doors, each weighing 800 tons. These will run on 40 wheels when opening or closing. They will be operated electrically, each door to have an alternating current motor of two ratings, either 200 hp., 600 r.p.m., or 100 hp., 300 r.p.m. Special electro-hydraulic brakes will be used to stop the movement, and special control devices such as limit switches, interlocking mechanisms, etc., will simplify the operation. The General Electric Co. will furnish the electrical equipment.

The Bethlehem Steel Co. has moved its Cleveland sales office from the Union Trust Building to 2600 Terminal Tower Building.

\*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

**Bolts, Nuts and Rivets.**—Output is up a trifle and now averages for the industry as a whole between 70 and



# Philadelphia

## Plate Mills Operating At High Rate—Steel Scrap Supply Small and Prices are Stronger

PHILADELPHIA, April 2.—With steel mills in this district operating full, and in some instances rolling in excess of rated capacity, a shortage of semi-finished material is a likelihood. The leading eastern Pennsylvania interest in March produced more ingots than its rated capacity. Plate producers, handicapped somewhat by a scarcity of heavy melting steel, are drawing on yard stock of ingots, as open-hearth furnaces cannot keep up with the demands from the mills. Deliveries of plates, shapes and bars range from two to four weeks, but sheet mills are quoting about five weeks on blue annealed. Pig iron buying is improving. Some large users of foundry iron have not yet covered all of their second quarter needs. A basic consumer has bought about 30,000 tons within a fortnight. Iron and steel scrap brokers are paying 50c. to \$1 per ton more than they are receiving on contracts for No. 1 heavy melting steel and still are unable to secure sufficient tonnage to satisfy the mills.

**Pig Iron.**—Furnaces are adhering firmly to \$21 per ton on foundry iron in eastern Pennsylvania, when competition from other districts is not encountered. With Buffalo quotations at a higher level, no shading of this price is reported, except in the case of a purchase of about 3000 tons of foundry iron for a Baltimore plant. In this case, a concession from \$21 per ton, furnace, is said to have been necessary because of competition from Southern sellers. Award was made to eastern Pennsylvania makers and a New York State furnace. The American Engineering Co., Philadelphia, has divided 600 tons of No. 3 and 1X foundry iron between two eastern Pennsylvania furnaces. The Navy Yard, Washington, opened bids today on 900 tons of low phosphorus iron and is inquiring for 96 tons of foundry iron. Basic has been increasingly active, with consumers using more tonnage in the absence of an adequate supply of scrap. The Claymont mill, which bought about 20,000 tons a fortnight ago from five eastern Pennsylvania furnaces, has placed 10,000 tons more with two makers. The consumer at Coatesville, which has bought upward of 35,000 tons since Jan. 1, is expected to buy again this month.

### Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to	\$21.76
East. Pa. No. 2X, 2.25 to	22.26
East. Pa. No. 1X, 2.25 to	22.76
Basic (del'd east. Pa.)	20.25 to 20.50
Gray forge	20.50 to 21.00
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Con. b'r'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.79
Va. No. 2X, 2.25 to 2.75 sil.	25.29

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

**Ferroalloys.**—The leading merchant producer of ferromanganese is now operating on spiegeleisen at its Oriskany furnace at Reusens, Va., using low-grade manganese ore. Spiegeleisen prices are unchanged at \$33 to \$34 per ton, furnace, for ordinary lots.

**Billets.**—Although in a number of cases consumers overspecified on their contracts for first quarter to obtain a \$1 a ton price advantage, consumption is so high a rate that contracts for

second quarter have been entered into. Quotations are \$34 per ton, Pittsburgh, for rolling, and \$39, Pittsburgh, for forging quality.

**Bars.**—Contracting has been active, with 1.95c., Pittsburgh, or 2.27c. per lb., delivered Philadelphia, firmly maintained. Mills are operating at a high rate. Deliveries are becoming slightly more extended on certain sizes.

**Shapes.**—Recent low delivered prices on structural shapes, figuring back to 1.90c., f.o.b. nearest mill to consumer, have practically disappeared, but 1.95c. and 2c. per lb., nearest mill to consumer, or 2.01c. to 2.06c., Philadelphia, are still reported on much of the business being placed. Some contracts have been closed for second quarter at 2.05c., mill, or 2.11c., Philadelphia.

**Plates.**—Operations of some mills are reaching record proportions, and all are running at capacity and are consuming ingots more rapidly than they can produce them. Although mills are booking a substantial tonnage of plates from eastern Pennsylvania consumers, their present well-filled condition is due largely to business from other districts. The railroads have contributed good tonnages. Some business is in prospect from shipbuilders. The Newport News

### Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.60c.
Cold-fin. steel, sq. and flats	4.10c.
Steel hoops	3.40c.
Steel bands, No. 12 to ⅜-in., inclus.	3.15c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.10c.
†Galvanized sheets (No. 24)	4.85c.
Blue ann'd sheets (No. 10)	3.25c.
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

\*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.  
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Shipbuilding & Dry Dock Co. is expected to receive an award of four ships and the New York Ship Building Corporation two ships, requiring about 5000 tons of plates each, from the Dollar Steamship Line. Contracting for plates has been active at 2.05c., Coatesville.

**Sheets.**—Mills are well booked with blue annealed tonnage for this quarter at 2.10c. to 2.20c., Pittsburgh, or 2.42c. to 2.52c., Philadelphia. Contracting for black and galvanized sheets has been meager, but most makers are well engaged on specifications taken last month at the first quarter prices. Buyers are showing some resistance to paying 2.95c., Pittsburgh, on black and 3.70c., Pittsburgh, on galvanized, an advance of \$2 a ton, while still receiving deliveries of sheets bought at the lower prices, and a real test of the firmness of the present market is still lacking, as current bookings generally cover consumers' needs to the end of April or later.

**Imports.**—In the week ended March 30, 3905 tons of chrome ore was received at this port from Cuba. Pig iron imports totaled 2000 tons, all from the United Kingdom, and 300 tons of spiegeleisen also came from England. Steel arrivals were 20 tons of structural shapes from Germany and 24 tons of strip steel from the United Kingdom.

**Old Material.**—All grades of scrap are decidedly strong. Brokers are freely offering \$17 to \$17.50 for No. 1 heavy melting steel to fill contracts, some of which were taken at lower figures. Brokers say that supplies of No. 1 heavy melting steel are inadequate to meet the requirements of current mill operations. No new purchases of No. 1 steel have been made by consumers, but sellers are unwilling to consider new contracts at less than \$18 per ton. No. 2 heavy melting steel is being bought at \$14 per ton, delivered Conshohocken, Pa., to fill \$13.50 per ton contracts, and bundled sheets have been sold at \$12 per ton, an advance of 50c.

### Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$17.00 to \$17.50
Scrap T rails	15.50 to 16.00
No. 2 heavy melting steel	12.50 to 13.50
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.50 to 12.00
Hydraulic compressed, new	15.00 to 16.00
Hydraulic compressed, old	13.00 to 13.50
Machine shop turnings (for steel works)	11.50 to 12.00
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	16.00 to 16.50
Railroad grate bars	13.00 to 13.50
Stove plate (for steel works)	13.00 to 13.50
No. 1 low phos., hvy., 0.04% and under	20.00 to 21.00
Couplers and knuckles	19.00 to 19.50
Roller steel wheels	18.50
No. 1 blast f'nace scrap	10.00 to 10.50
Wrot. iron and soft steel pipes and tubes (new specific.)	15.50
Shafting	19.00 to 20.00
Steel axles	23.00 to 23.50
No. 1 forge fire	14.00 to 14.50
Cast iron carwheels	16.50
No. 1 cast	18.50 to 17.00
Cast borings (for chem. plant)	15.00
Steel rails for rolling	17.00 to 17.50



# New York

## Steel Pipe Orders for St. Louis Gas Line, 115,000 Tons, Awarded—Pig Iron Buying Subsidies

NEW YORK, April 2.—Demand for pig iron is subsiding. Second quarter contracting has been largely completed. While a few large buyers have not covered their requirements for the coming three months, they may elect to place orders for material as it is needed. The recent advance in Buffalo iron has also tended to chill demand, although this is the usual initial effect of higher prices. Some small lots of foundry iron, totaling 600 or 700 tons, have been placed at as high as \$19, base Buffalo, but \$17.50 is still being quoted by at least one producer. Although eastern Pennsylvania foundry iron also shows indications of greater strength, quotations of \$19.50, base furnace, on material for delivery in this district, have not disappeared. Unwillingness on the part of canal barge operators to shade their published rates is discouraging water shipments from Buffalo. Pig iron continues to be barged in fair quantities from northern New York and New England. A Brooklyn consumer has closed for 500 tons of barge iron for shipment from the New England furnace. The most conspicuous pending inquiries call for 1000 tons, 850 tons and 500 tons respectively. A New Jersey melter has bought 3000 tons of eastern Pennsylvania iron.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75	
to 2.25	\$22.41 to \$23.91
*Buf. No. 2, del'd east.	
N. J.	20.78 to 22.28
East. Pa. No. 2 fdy., sil.	
1.75 to 2.25	20.89 to 22.02
East. Pa. No. 2X fdy., sil.	
2.25 to 2.75	21.39 to 22.52
East. Pa. No. 1X fdy., sil.	
2.75 to 3.25	21.89 to 23.02

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

\*Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

**Ferroalloys.**—Sales of carloads and small lots of ferromanganese for early delivery are noted at \$105, sea-board basis. A little business in spiegeleisen has been placed at unchanged prices. Another domestic producer has started to make this alloy in a Virginia furnace, so that now three companies are making spiegeleisen.

**Reinforcing Bars.**—The McClintic-Marshall Co. has taken 1250 tons for two subway sections and the Concrete Steel Co. has booked 750 tons for similar work. Several other sizable jobs have been let during the week. The volume of small work continues to increase. Reinforcing bar distributors have not yet felt the effects of the decline in building contracts in the metropolitan territory, and any loss in this line of work is likely to be offset by the large volume of public work, including subways, bridges, etc., which is scheduled to come out

during the next two or three months. Prices are unchanged.

Billet steel reinforcing bars in 40, 50 and 60-ft. lengths, 2.05c. per lb., Pittsburgh, and 2.30c. per lb., Pittsburgh warehouse, for cut lengths. Out of New York warehouse, 2.90c. per lb. for lots of 5 tons or more, 3.05c. for lots of 2 to 5 tons and 3.30c. for less than 2 tons, all delivered at job.

**Pipe.**—The Standard Oil Co. of New Jersey has awarded about 115,000 tons of gas pipe for the Monroe, La.-St. Louis gas line to be built for the Mississippi River Fuel Corporation. The A. O. Smith Corporation, Milwaukee, will fabricate about 325 miles, or 62,000 tons, and the remainder of the 22-in. pipe for the main line and 25 miles of 16-in. pipe for a feeder line will be furnished by the National Tube Co. Full details of the awards are given elsewhere in this issue.

**Cast Iron Pipe.**—Bids opened April 1 by Albany, N. Y., on 29,700 tons of water pipe brought out only one offer for the entire tonnage, a bid by the United States Cast Iron Pipe & Foundry Co., and two offers on parts of the tonnage from R. D. Wood & Co. and the Warren Foundry & Pipe Co. At the opening of bids on about 12,000 tons of 4 to 30-in. pipe by the Department of Purchase, New York, four Northern makers were low on 3000 tons each, the United States Cast Iron Pipe & Foundry Co., R. D. Wood & Co., Warren Foundry & Pipe Co. and the Donaldson Iron Co. Pontiac, Mich., has awarded 2600 tons to the Herbert Kennedy Co., which will furnish French pipe. The Herbert Kennedy Co. was also low bidder on 5000 tons of a total inquiry for 14,000 tons at Detroit. Among recent small municipal inquiries are 115 tons of gas pipe for the Lewiston Gaslight Co., Lewiston, Me., 475 tons of 4, 6, 8 and 10-in. water pipe for Dundee, N. Y., and 85 tons of 6 and 8-in. water pipe for Newburgh, N. Y. The Ansonia Water Co., Ansonia, Conn., is reported to be inquiring for 150 tons. Prices are being maintained at \$36 to \$38 per ton, f.o.b. New Jersey foundries. Southern makers are offering little competition.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, \$28.60 to \$40.60; 4-in. and 5-in., \$43.60 to \$45.60; 3-in., \$53.60 to \$55.60. Class A and gas pipe, \$3 extra.

**Plates, Shapes and Bars.**—Eastern plate mills, which permitted customers to specify against first quarter contracts up to the last day of March, received a flood of shipping orders last week, with the result that all mills are this week operating nearly at capacity. The larger producers of bars and shapes did not accept such specifications after March 15. As of April 1, prices are firm at 2.05c., Coatesville, on plates and at 2.05c., Bethlehem, on shapes, but on

these products the real test of the new prices will come in about two weeks, when some consumers probably will need to specify against second quarter contracts. On bars, 1.95c., Pittsburgh, is firm and has been tested. Deliveries are lengthening on all three products. Plates, which have been obtainable until recently in a week or 10 days, are now seldom promised in less than three weeks. Lengthening deliveries have caused

### Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter	
hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'd sheets (No. 10)	3.85c. to 3.90c.
Long terme sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1 1/2 x 1/2 in. and larger	3.30c.
Smooth finish, 1 to 2 1/2 x 1/4 in.	
and larger	3.65c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.
	Per Cent Off List
Machine bolts, cut thread:	
1/2 x 6 in. and smaller	.60
1 x 30 in. and smaller	.50 to 50 and 10
Carriage bolts, cut thread:	
1/2 x 6 in. and smaller	.60
1/2 x 20 in. and smaller	.50 to 50 and 10
Coach screws:	
1/2 x 6 in. and smaller	.60
1 x 16 in. and smaller	.50 to 50 and 10
Boller Tubes—	Per 100 Ft.
Lap welded, 2-in.	\$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

### Discounts on Welded Pipe

Standard Steel—	Black	Galv.
1/2-in. butt.	46	29
3/4-in. butt.	51	37
1-3-in. butt.	53	39
2 1/2-6-in. lap.	48	35
7 and 8-in. lap.	44	17
11 and 12-in. lap.	37	12
Wrought Iron—		
1/2-in. butt.	5	+19
3/4-in. butt.	11	+9
1-1 1/2-in. butt.	14	+6
2-in. lap.	5	+14
3-6-in. lap.	11	+6
7-12-in. lap.	3	+16

### Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC	\$9.70	\$12.10
IX	12.00	14.25
IXX	13.90	16.00

### Terne Plate (14 x 20 in.)

IC—20-lb. coating	\$10.00 to \$11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

### Sheets, Box Annealed—Black, C. R.

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

### Sheets, Galvanized

	Per Lb.
No. 14	4.40c.
No. 16	4.25c.
No. 18	4.40c.
No. 20	4.50c.
No. 22	4.60c.
No. 24	4.75c.
No. 26	5.00c.
No. 28*	5.25c.
No. 30	5.65c.

\*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

concern to some buyers who find that the prompt shipments they have been accustomed to are not easily obtainable. The New York Central Railroad opened bids today (Tuesday) on its third quarter steel requirements. Bids were generally in line with the announced prices for the second quarter. The tonnage of steel in prospect in building construction is unusually heavy, and the awards of the past week have been large. Subway work contracted for requires 22,300 tons, of which the American Bridge Co. will fabricate 14,100 tons and the McClintic-Marshall Co. 8200 tons. The Levering & Garrigues Co. was awarded 13,000 tons for an office building at 114 Wall Street. About 10,000 tons is the total of a number of miscellaneous projects in New York, including apartment buildings, lofts and schools. The American Locomotive Co. will fabricate 4400 ft., about 500 tons, of 48-in. pipe for a water line on 111th Street, New York, and the Melrose Contracting Co. was awarded 500 tons for tanks for the Government arsenal at Iona Island, near Peekskill, N. Y.

*Mill prices per lb., deliv'd New York:* Soft steel bars, 2.29c.; plates, 2.22½c.; structural shapes, 2.19½c.; bar iron, 2.14c.

**Coke.**—Standard furnace coke is receding from the recent level of prices, and large consumers have recently been able to buy at about \$2.85 per ton, ovens. Standard foundry is quiet and the price unchanged at \$3.50 to \$3.75 per net ton, Connellsville. Special brands are quoted at \$4.85 per net ton, ovens, or \$8.56, delivered to northern New Jersey, Jersey City and Newark, and \$9.44 to New York and Brooklyn. By-product coke is quoted at \$9 to \$9.40 per net ton, Newark or Jersey City, and \$10.06, New York or Brooklyn.

**Warehouse Business.**—Improvement in demand, which appeared in the closing days of March, is sus-

tained, and jobbers handling structural steel report a steady increase in the size of orders. Demand for black and galvanized sheets is fair, but concessions still appear, even on small lots.

**Old Material.**—Brokers are paying \$17.50 per ton for No. 1 heavy melting steel, delivered to consumers at Claymont, Del., and Coatesville, Pa., which is a sufficient advance to prevent available supplies in this and the New England districts from going to western Pennsylvania. Although contracts with consumers of No. 2 steel are at \$13.50 per ton, brokers are paying \$13.50 and \$14 per ton, delivered, to obtain sufficient material, except in the case of a Pottsville, Pa., mill, which accepts a yard grade of steel, bought by brokers at about \$12.25 per ton, delivered. Heavy breakable cast scrap is being bought at \$16 and \$16.25 per ton, delivered eastern Pennsylvania, and buying prices on other grades of scrap show advances. Brokers are encountering difficulty in filling their contracts.

*Dealers' buying prices per gross ton, f.o.b. New York:*

No. 1 heavy melting steel	\$12.85 to \$14.00
Heavy melting steel (yard)	8.50 to 9.75
No. 1 hvy. breakable cast	12.00 to 12.50
Stove plate (steel works)	9.00 to 9.50
Locomotive grate bars	9.00 to 9.50
Machine shop turnings	7.75 to 8.00
Short shoveling turnings	7.75 to 8.00
Cast borings (blast furn. or steel works)	7.00 to 7.25
Mixed borings and turnings	6.25 to 6.50
Steel car axles	19.25 to 19.75
Iron car axles	24.50 to 25.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	11.75
Forge fire	10.50 to 10.75
No. 1 railroad wrought	12.50 to 13.00
No. 1 yard wrought, long	11.50 to 12.00
Rails for rolling	13.50 to 14.00
Cast iron car wheels	12.50 to 12.75
Stove plate (foundry)	9.00 to 9.50
Malleable cast (railroad)	14.00 to 14.50
Cast borings (chemical)	10.50 to 11.00

*Prices per gross ton, deliv'd local foundries:*

No. 1 machry. cast	\$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

for water shipment to Detroit, and a cargo of 2500 tons will be shipped as soon as navigation opens. The steel will be delivered at consumers' plants at a transportation cost of about \$3 a ton, compared with a rail rate of \$4.70 a ton.

While plates and structural material are in fair demand, mills can make rather prompt deliveries. In the structural field, an award of 7000 tons for the Midland Bank Building, Cleveland, is the outstanding item. New inquiry in the building field is rather light.

Quotations on steel bars range from 1.95c. to 2c., Cleveland. Plates and structural shapes are quoted at 1.95c., Pittsburgh.

**Pig Iron.**—Buying of foundry and malleable iron for the third quarter commenced in this territory during the week, two or three producers taking a moderate tonnage for that delivery at their second quarter prices. While some of this business was in contracts for only the third quarter, most buying for that delivery was in connection with the contracts also covering the second quarter. Sales by Cleveland interests gained sharply during the week, amounting to 63,000 tons, compared with 40,000 tons during the previous week. Several of the orders came from foundries in Cleveland and nearby territory, the largest having been 5000 tons placed by a Cleveland foundry which makes automobile castings. The only price change during the week is an advance of 50c. a ton to \$20.50 for foundry iron by one producer for shipments to the Michigan territory, following a similar advance by Detroit furnaces. Cleveland furnaces continue to quote foundry and malleable iron at \$18.50, furnace, for outside shipment and \$19 for local delivery. Another Lake furnace producer is quoting \$19 for Ohio and Indiana shipment. While the advance in ore prices has caused some talk of higher pig iron prices, the third quarter sales, for the most part, were made by furnaces that have not advanced their prices recently. The only advances in this territory since the 1929 ore prices came out are for Michigan shipment and by Buffalo furnaces. The only activity in steel making iron is the purchase of 500 tons of basic iron by a western Ohio consumer from a Lake furnace. The Hanna Furnace Co. has blown in the Detroit furnace that went out the first of the month for relining.

*Prices per gross ton at Cleveland:*

N'th'n fdy., sil 1.75 to 2.25	\$19.50
S'th'n fdy., 1.75 to 2.25	21.50
Malleable	19.50
Ohio silvery, 8 per cent	29.00
Basic Valley furnace	\$17.50 to 18.00
Stand. low phos., Valley	26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

**Iron Ore.**—The ore market has continued active since the establishment of prices at an advance of 25c. a ton and most open market buyers have placed contracts for their requirements for the season, although the inquiry from the Ford Motor Co. is still pending. Purchases by open market buy-

## Cleveland

### Pressure for Steel Deliveries Eases Slightly, Consumption Remaining Large—Third Quarter Pig Iron Sold

CLEVELAND, April 2.—While business with most mills is holding up to recent volume, others report a slight decrease the past week and there is less pressure from some sources for deliveries. This does not indicate any slowing down in the consumption, but rather that many buyers have got in their specifications for rather extended requirements. No lessening of the demand is expected as long as the automotive industry keeps up its present rate of operation, and the curtailment by two or three motor car manufacturers is not sufficient to cause a noticeable effect in the demand for steel from this source. In fact, it has perhaps been fully offset by a larger production by one or two other automobile manufacturers. With inadequate supplies of semi-finished steel to operate all departments at capacity, some of the mills are centralizing production on their more profitable products. The price advances for the second quarter on steel bars, plates and structural shapes are being maintained. Most consumers have taken out contracts at the new prices and liberal specifications are being issued for material at these prices. Steel bars, sheets and strip continue to be the more active items.

Deliveries on bar mill products have become more extended, ranging from three to six weeks on small bars

and up to two or three months on small shapes. Cleveland mills have taken considerable steel bar tonnage



ers, as well as commitments for the season by consumers having long term contracts covering maximum and minimum quantities, average about 10 per cent larger than last year. The vessel rates that prevailed on ore last season have been reestablished for 1929. They are 70c. per gross ton for shipments from the head of Lake Superior to Lake Erie ports, 63c. from Marquette and 52½c. from Escanaba. From Escanaba to Chicago the rate is 42c.

**Semi-Finished Steel.**—The shortage in supply continues, and at least two mills in the Valley district would, if possible, supplement their own supply by outside purchases. Deliveries by a local mill have become extended beyond 30 days. New specifications are against the second quarter prices.

**Sheets.**—The demand is holding close to the recent heavy volume. Deliveries by some of the mills have become slightly more extended on auto body and other sheets of various finishes, although common black sheets can still be purchased for April shipment. Considerable of the new business is still going at the first quarter prices. Concessions to jobbers are rather common and they, as well as some consumers, can buy common black sheets at 2.85c., Pittsburgh, and galvanized at 3.60c. On full finished sheets some of the mills are quoting the 2.85c. base rather freely. Blue annealed sheets and wide material rolled on continuous mills range from 2.10c. to 2.20c.

**Cold Finished Steel Bars.**—The market appears to be firm at the 2.35c. Cleveland price, as mills are getting some business at the advance either in specifications against contracts or in current orders. The demand from screw machine product plants making automobile parts is heavy and there is strong demand for shafting.

**Wire Products.**—Manufacturers' wire is in very good demand, but nails are still rather sluggish. Regular prices apparently are being well maintained.

**Warehouse Business.**—Local jobbers have advanced prices \$2 a ton on black and galvanized sheets, reflecting the advance in mill quotations. Jobbers say they are now paying \$2 a ton more for sheets than for

the last quarter. Warehouse business is good in most lines.

**Strip Steel.**—Hot-rolled strip continues in heavy demand from the automotive industry, and deliveries are becoming somewhat more deferred. Deliveries of from eight to 10 weeks are promised on narrow strip and four weeks on wide material. As most buyers are under contract, there is not much new business. Consumers are specifying against second quarter contracts taken at 1.90c., Pittsburgh, for wide strip and 2c. for narrow. Cold-rolled strip orders equal production. Most business is being taken at 2.75c., Cleveland and Pittsburgh, with the new extras. Small lots in some cases bring \$2 a ton more.

**Old Material.**—Mills in this territory continue to take large shipments against contracts, but are not buying additional scrap. Dealers are purchasing considerable steel making and blast furnace scrap at the quoted prices to fill old orders. While the supply is plentiful, the market is firm, with prices unchanged, as lower prices locally would tend to divert scrap to other consuming points. Water shipments of scrap from Detroit to Cleveland will commence shortly.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.....	\$15.50 to \$16.00
No. 2 heavy melting steel.....	15.00 to 15.50
Compressed sheet steel.....	15.00 to 15.50
Light bundled sheet stampings.....	12.00 to 12.50
Drop forge flashings.....	13.00 to 13.25
Machine shop turnings.....	9.75 to 10.00
No. 1 railroad wrought.....	13.25 to 13.50
No. 2 railroad wrought.....	16.00 to 16.50
No. 1 busheling.....	12.50 to 13.00
Pipes and flues.....	9.00 to 9.50
Steel axle turnings.....	12.50 to 13.00

Acid Open-Hearth Grades	
Low phos., forging crops.....	18.50 to 19.00
Low phos., billet, bloom and slab crops.....	18.50 to 19.00
Low phos. sheet bar crops.....	18.00 to 18.50
Low phos. plate scrap.....	18.00 to 18.50

Blast Furnace Grades	
Cast iron borings.....	11.50 to 11.75
Mixed borings and short turnings.....	11.50 to 11.75
No. 2 busheling.....	11.50 to 11.75

Cupola Grades	
No. 1 cast.....	16.75 to 17.25
Railroad grate bars.....	11.00 to 12.00
Stove plate.....	12.00 to 12.50
Rails under 3 ft.....	16.75 to 17.25

Miscellaneous	
Railroad malleable.....	16.00 to 16.50
Rails for rolling.....	16.25 to 16.50

**Coke.**—A fair amount of business is coming out in Connellsville foundry coke and specifications are good. Prices are steady, with good grades available at \$4 to \$4.50 per net ton. Ohio by-product foundry coke is quoted at \$8.25, Painesville, for April shipment.

**Bolts, Nuts and Rivets.**—Specifications against bolt and nut contracts showed a gain in March over January and February. Orders continue heavy from the automotive industry, and consumers in other fields are taking a good volume. Rivet manufacturers report that they have not encountered much resistance to the \$4 a ton price advance on large rivets and that they have closed contracts with most of their customers for the second quar-

ter at the new 3.10c., Cleveland and Pittsburgh, price. Specifications against old contracts were accepted until April 1, and there was a heavy volume of orders against these contracts during the last few days of the month.

## Looks for High April Rate in Steel Making

Eugene G. Grace, president of the Bethlehem Steel Corporation, told the shareholders gathered in annual meeting, April 2, at Newark, that the company is operating at approximately 100 per cent capacity.

"As a result of heavy expenditures made for plant and improvements in recent years," said Mr. Grace, "our properties are in excellent condition. In 1928 our rated steel capacity was increased from 7,600,000 tons to 8,000,000 tons annually. During the first quarter our production was in excess of this rate of capacity and all indications are that a similar rate will obtain during April."

## Electrically Welding Pipe Line of 205 Miles in Field

A pipe line 205 miles long, running from Jal, N. M., to El Paso, Tex., is being electrically welded. This pipe line, 16 in. in diameter, will carry gas for the El Paso Utilities Co., and is being installed by Smith Brothers, Inc., general contractor.

The electric arc welding of the pipe line requires the use of 27 General Electric Co. welding equipments, some mounted on Fordson tractors and driven by the tractor engine, and others mounted on trucks and trailers.

The pipe, in 30-ft. sections, is strung along the cleared right-of-way. Seven of the 30-ft. lengths are then lined up, making a section somewhat over 200 ft. long. One welding crew fixes the sections temporarily in position by tack welding and another completes the welds.

By the use of 3/16-in. diameter welding electrode and a current of approximately 175 to 190 amp., the greatest welding speed consistent with the highest quality weld is obtained. Each operator is able to make about 13 welds in 10 hr.

After the final welding operation is completed, the joints are tested and then treated with a corrosion resisting compound, after which the pipe is lowered into the ditch.

The Brazilian market for industrial machinery is apparently almost equally divided among the United States, Germany and the United Kingdom, and the trend of the American trade has been upward, while that of the other two countries has been downward, according to a study made by S. R. March, Industrial Machinery Division, Department of Commerce.

## Warehouse Prices, f.o.b. Cleveland

Base per Lb.	
Plates and struc. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....	2.25c. to 2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands, No. 12 to 14 in. inclusive.....	3.25c.
Hoops and bands, No. 13 and lighter.....	3.65c.
Cold-finished strip.....	5.95c.
Black sheets (No. 24).....	3.70c.
Galvanized sheets (No. 24).....	4.55c.
Blue ann'l'd sheets (No. 10).....	3.25c.
No. 9 ann'l'd wire, per 100 lb.....	\$2.95
No. 9 gal. wire, per 100 lb.....	3.40
Com. wire nails, base per keg.....	2.95

\*Net base, including boxing and cutting to length.



## Pacific Coast

### Fair-Sized Tonnages of Structural Steel and Cast Iron Pipe Placed—Building Construction Active

SAN FRANCISCO, March 30 (*By Air Mail*).—The outstanding activity of the past week was in structural steel and cast iron pipe. Building construction on the Pacific Coast is holding up to about the level of a year ago. In Los Angeles total permits so far this year run in value \$700,000 ahead of those taken out in the corresponding period of last year, but in the first 20 days of March there was a decided drop compared with the same number of days in March last year.

Bids on two steamships for the Matson Navigation Co., requiring about 20,000 tons of plates and shapes, probably will be rejected, the minimum having exceeded the estimates. Whether new bids will be asked for has not been announced.

**Pig Iron.**—Foundry operations are gaining, but melters continue to cover for pig iron as their needs arise, buying usually in small lots for prompt shipment. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	.....	\$25.00 to \$26.00
*Utah fdy., sil.	2.75 to	
3.25	.....	25.00 to 26.00
**Indian fdy., sil.	2.75 to	
3.25	.....	24.00 to 25.00

\*Delivered San Francisco.  
\*\*Duty paid, f.o.b. cars San Francisco.

**Bars.**—Reinforcing steel bar awards this week totaled more than 1400 tons and included 525 tons for a plant in Emeryville, Cal., for the Western Electric Co., taken by Soule Steel Co., and 300 tons for piers for the Longview bridge at Seattle. Pending business involves more than 3000 tons and new inquiries of the week include 500 tons for buildings in Honolulu for the Dillingham Transport Co. and 490 tons for a school in San Francisco. Reinforcing steel bars out-of-stock in the San Francisco and Los Angeles districts range from 2.20c. to 2.30c., base, for carload lots and up to 2.60c. for smaller lots. Merchant bars appear to be firm at 2.35c., c.i.f. Coast ports.

**Plates.**—Sierra Madre, Cal., will open bids on April 9 for 240 tons of 4 to 16-in. riveted, welded or cast iron pipe. Plate prices remain at 2.35c., c.i.f. Coast ports.

**Shapes.**—Included among the structural awards of the week was 1500 tons for a bridge at Seattle, placed

with the Wallace Bridge & Structural Steel Co., and 600 tons for a hotel at Fairfax, Cal., booked by the Judson-Pacific Co. The Consolidated Steel Corporation took 200 tons for a store building in Los Angeles. A fair tonnage of business is up for figures. New inquiries include 450 tons for a warehouse in Oakland and 200 tons for an apartment house in San Francisco. Prices on shapes remain firm at 2.35c., c.i.f.

**Cast Iron Pipe.**—The cast iron pipe market was active in the past week, and awards included 1480 tons of 30-in. Class B, 532 tons of 24-in. and 205 tons of 16-in. Class B for Los Angeles, placed with the United States Cast Iron Pipe & Foundry Co., the American Cast Iron Pipe Co. and C. G. Claussen & Co. respectively. The Pacific States Cast Iron Pipe Co. took about 100 tons of 6-in. Class 150 pipe for Astoria, Ore. The National Cast Iron Pipe Co. booked 350 tons of

16-in. Class 100 for Eugene, Ore., and the United States Cast Iron Pipe & Foundry Co. 164 tons of the same size for the same city. The American Cast Iron Pipe Co. was awarded 200 tons for Mount Vernon, Wash., and 613 tons of 18 and 20-in. Class B for Vancouver, Wash. Monterey Park, Cal., placed 113 tons of 4 to 12-in. Class 150 pipe for the Midwick View Estate with the United States Cast Iron Pipe & Foundry Co. Bids were opened this week on 324 tons of 10 to 20-in. Classes B and C pipe for Wenatchee, Wash., and on 667 tons of 4 to 12-in. Class B for South Gate, Cal. New inquiries include 405 tons of 4 to 18-in. Class B pipe for San Bernardino, Cal., bids on which have just been opened; 819 tons of 4 to 6-in. Class 150 for Sierra Madre, Cal., bids to be opened on April 9, and 176 tons of 4 and 8-in. Class B pipe for San Bernardino County, Cal., bids opening on April 1.

**Sheets.**—Demand for blue, black and galvanized sheets, while not particularly heavy, is well maintained, and c.i.f. prices are now as follows: No. 10 gage blue annealed, 2.725c.; No. 24 black 3.50c., and No. 24 galvanized, 4.25c.

## Birmingham

### Business in Plates, Shapes and Bars Increases—Structural Market Active—Pig Iron Quiet

BIRMINGHAM, April 2.—The pig iron market is entering the third week since books were opened for the second quarter. Many of the melters in the district have sufficient stocks to carry them through April, and they seem to be in no hurry to cover their requirements for the remainder of the quarter. Slow buying in the district has been offset somewhat by several substantial tonnages booked from outside points at the new base price of \$15.50 for the second quarter. Shipping instructions already received for April indicate an increase in melt over that of March. Increased operations by pipe foundries are expected during this month. There have been no changes in furnace operations during the past week. Of the 18 in blast, 10 are on foundry, seven on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	.....	\$15.50
No. 1 fdy., 2.25 to 2.75 sil.	.....	16.00
Basic	.....	15.50

**Finished Steel.**—Increased business in plates, shapes and bars was the only change of any consequence in the market during the past week. More pressure for deliveries was felt. There are no particularly weak spots in the market, and sales executives are confident that April activity will approximate that of March. Considerable steel will be required for railroad car shops which have just started operations. Prices are unchanged.

Fabricated structural steel lettings have been numerous during the past week. The Ingalls Iron Works Co. closed a contract for 2150 tons for the Jefferson County court house at Birmingham, also 450 tons for the Chicago Mill & Lumber Co. plant at Greenville, Miss.; 230 tons for a criminal courts building at New Orleans; 125 tons for addition to Southern Mangarese Corporation plant, Anniston, Ala., and 100 tons for addition to Tennessee Copper Co. plant at Copperhill, Tenn. Among the new orders of the Virginia Bridge & Iron Co. were 800 tons for miscellaneous bridge work of Louisville & Nashville Railroad; 250 tons for a stadium at Birmingham; 240 tons for a highway bridge in Texas; 260 tons for Southern Pacific Railroad bridge and 170 tons for airplane hangar at Miami, Fla. The Nashville Bridge Co. will furnish 175 tons for a college building at Montgomery, Ala. Several small orders for reinforcing bars have been reported. The Tennessee company is operating seven or eight open-hearths at Ensley and seven at Fairfield. The Gulf States Steel Co. continues to work five at Alabama City.

**Cast Iron Pipe.**—Pressure pipe plants have bids in on a project at Detroit requiring 14,340 tons. Several smaller projects have been up for figures in the last three or four days, but no awards have been made. Small-lot business was better last week, and

#### Warehouse Prices, f.o.b. San Francisco

Base per Lb.

Plates and struc. shapes	.....	3.15c
Soft steel bars	.....	3.15c
Small angles, $\frac{3}{8}$ -in. and over	.....	3.15c
Small angles, under $\frac{3}{8}$ -in.	.....	3.55c
Small channels and tees, $\frac{3}{4}$ -in. to 2 $\frac{3}{4}$ -in.	.....	3.75c
Spring steel, $\frac{1}{4}$ -in. and thicker	.....	5.00c
Black sheets (No. 24)	.....	4.90c
Blue ann'l'd sheets (No. 10)	.....	3.80c
Galv. sheets (No. 24)	.....	5.30c
Struct. rivets, $\frac{1}{2}$ -in. and larger	.....	5.65c
Com. wire nails, base per keg	.....	\$3.40
Cement c't'd nails, 100 lb. keg	.....	3.40

shipping instructions showed considerable improvement over those of the previous week. Operations increased during the last two weeks of March, but they are still below normal for this season. A fair degree of firmness is reported in prices, which remain at \$37 to \$38 for 6-in. and larger diameters.

**Old Material.**—The market is spotty and considerably slower than dealers had expected it to be at the opening of the second quarter. Rejections and holdups were disturbing

factors throughout March, and mill buying was below normal. Prices are still weak but unchanged.

*Prices per gross ton, deliv'd Birmingham dist. consumers' yards:*

Heavy melting steel.....	\$12.50
Scrap steel rails.....	\$12.00 to 12.50
Short shoveling turnings.....	9.00
Cast iron borings.....	8.00
Stove plate.....	13.50
Steel axles.....	20.00
Iron axles.....	22.00
No. 1 railroad wrought.....	10.00 to 10.50
Rails for rolling.....	14.00 to 15.00
No. 1 cast.....	14.50
Tramcar wheels.....	13.00 to 14.00
Cast iron carwheels.....	13.00 to 13.50
Cast iron borings, chem.....	13.50 to 14.00

## Cincinnati

### Northern and Southern Pig Iron Present Contrasting Market Situations—Sheet Bookings Still Heavy

CINCINNATI, April 2.—With most consumers covered for second quarter, pig iron buying has subsided. Sales and inquiries in the past week were in small volume. So far as prices are concerned, the situation in Northern iron is in sharp contrast with that of Southern iron. Northern producers have large order books and have little iron to offer for delivery during the next three months. Consequently northern Ohio foundry is firm at \$18.50 to \$19, base furnace, and Valley iron is steady at \$18, furnace. Alabama and Tennessee interests, on the other hand, are reported to be in need of business on account of low consumption in the South. However, the recent drop to a basis of \$15.50, Birmingham, came after the majority of Northern users had already purchased Northern iron for their second quarter requirements, and under the circumstances bookings of Southern iron in this district have been comparatively light, despite the fact that the delivered prices to Cincinnati and other Ohio River points are lower than those of Northern iron. In some instances, Southern furnaces are said to be dipping under \$15.50 to obtain business. Southern Ohio iron is quoted at \$18.50 to \$19, base Ironton. A Dayton, Ohio,

melter is inquiring for 500 tons of Northern foundry.

*Prices per gross ton, deliv'd Cincinnati:*

So. Ohio fdy., sil. 1.75 to 2.25.....	\$20.39 to \$20.89
Ala. fdy., sil. 1.75 to 2.25.....	19.19
Ala. fdy., sil. 2.25 to 2.75.....	19.19
Tenn. fdy., sil. 1.75 to 2.25.....	19.19
S'th'n Ohio silvery, 8 per cent.....	27.89 to 28.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

**Coke.**—Specifications and orders for by-product foundry coke are holding up well and shipments during April are expected to fall only slightly short of those in March. Prices this month are unchanged at \$6.50, Connelssville, or \$10.05, delivered Cincinnati. The situation in Wise County beehive coke is easier, although unfilled orders still are heavy. The by-product domestic coke market is quiet.

**Finished Material.**—The leading independent sheet steel producer reports that bookings during March were at the rate of 130 per cent of capacity and that unfilled orders on

April 1 were the largest in its history. All units are operating at 100 per cent of capacity, with some mills scheduled at that rate for the entire second quarter. Demand is so heavy and deliveries are becoming so long deferred on some grades of sheets that consumers in many cases are endeavoring to protect their source of supply by placing third quarter business. However, these orders are not being accepted, in view of the fact that prices for that period have not yet been named. Quotations are firm and unchanged. Sales of structural steel are increasing, and a district office of a large steel producer reports that its specifications and orders for structural shapes and plates in March were the largest of any month since the office was opened.

**Old Material.**—While there has been little activity in the past week, the market has a firm tone. Dealers are having difficulty in obtaining material, especially steel works and malleable iron grades. Blast furnace items are showing a weak tendency, but cast iron scrap is steady. A pickup in buying by consumers is expected either the latter part of April or in May. Railroad offerings this week include: Big Four, 1300 tons; Norfolk & Western, 6300 tons; Baltimore & Ohio, 9300 tons; Virginian, 1340 tons.

*Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:*

Heavy melting steel.....	\$13.50 to \$14.00
Scrap rails for melting.....	13.75 to 14.25
Loose sheet clippings.....	9.75 to 10.25
Bundled sheets.....	10.75 to 11.25
Cast iron borings.....	9.00 to 9.50
Machine shop turnings.....	8.50 to 9.00
No. 1 busheling.....	10.75 to 11.25
No. 2 busheling.....	7.00 to 7.25
Rails for rolling.....	14.50 to 15.00
No. 1 locomotive tires.....	14.25 to 14.75
No. 2 railroad wrought.....	13.50 to 14.00
Short rails.....	18.50 to 19.00
Cast iron carwheels.....	12.75 to 13.25
No. 1 machinery cast.....	19.25 to 19.75
No. 1 railroad cast.....	15.25 to 15.75
Burnt cast.....	10.50 to 11.00
Stove plate.....	10.50 to 11.00
Brake shoes.....	10.50 to 11.00
Railroad malleable.....	15.50 to 16.00
Agricultural malleable.....	14.50 to 15.00

## Boston

### Pronounced Increase in Pig Iron Sales—Buffalo Iron Higher—Scrap Prices Advancing

BOSTON, April 2.—During the past week there was a pronounced increase in pig iron sales due to the activity of the Mystic Iron Works. Sales totaled 12,000 to 13,000 tons, of which more than 11,000 tons was Mystic iron. Of the 11,000 tons, all but 500 tons, which was bought by a Brooklyn melter, was for New England delivery in this quarter. The company's sales in March exceeded 40,000 tons. Buffalo iron was sold the past week at \$18 a ton, base furnace, with regular 50c. differentials. The Mystic Iron Works is meeting that price. Buffalo furnaces on a \$19 base did practically nothing the past week. Sales included Alabama, western Pennsylvania, and New York State iron. Some

Indian iron was sold at \$22 to \$22.50 a ton, on dock here, duty paid.

*Foundry iron prices per gross ton deliv'd to most New England points:*

*Buffalo, sil. 1.75 to 2.25.....	\$22.41 to \$23.91
*Buffalo, sil. 2.25 to 2.75.....	22.91 to 24.41
East. Penn., sil. 1.75 to 2.25.....	24.15 to 24.65
East. Penn., sil. 2.25 to 2.75.....	24.65 to 25.15
Va., sil. 1.75 to 2.25.....	25.21
Va., sil. 2.25 to 2.75.....	25.71
Ala., sil. 1.75 to 2.25.....	22.41 to 24.27
Ala., sil. 2.25 to 2.75.....	22.91 to 24.77

Freight rates: \$4.91 all rail from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to \$8.77 from Alabama.

\*All rail rate.

**Coke.**—By-product coke ovens in New England announced April 1 that the price of foundry coke for this month is \$11 a ton, delivered within

#### Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reinfrc. bars.....	3.15c.
Rail steel reinfrc. bars.....	3.00c.
Hoops.....	4.05c.
Bands.....	3.50c.
Cold-fin. rounds and hex.....	3.85c.
Squares.....	4.35c.
Black sheets (No. 24).....	3.90c.
Galvanized sheets (No. 24).....	4.75c.
Blue ann'd sheets (No. 10).....	3.45c.
Structural rivets.....	3.85c.
Small rivets.....	65 per cent off list
No. 9 ann'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg.....	2.95
Cement c't'd nails, base 100 lb. keg.....	2.95
Chain, per 100 lb.....	7.55
Net per 100 Ft.	
Lap-weld steel boiler tubes, 2-in.....	\$16.00
4-in.....	33.00
Seamless steel boiler tubes, 2-in.....	17.00
4-in.....	34.00



a \$3.10 freight rate zone. That price has been in effect for 13 consecutive months. Consumption of foundry coke in March ran ahead of that in February and in March, last year, but owing to the introduction of Koppers fuel in Connecticut the showing made by the older New England ovens is no more than even with February, this year, and March, 1928. Effective April 1, by-product domestic fuel in the greater Boston district was reduced 50c. a ton to \$12.50 a ton.

**Cast Iron Pipe.**—Haverhill, Mass., has awarded 500 tons of 4 to 12-in. pipe, and Beverly, Mass., 200 tons of 6-in. and 8-in. to the Warren Foundry & Pipe Co. Newton, Mass., has awarded 200 tons of 6-in. pipe, and Peabody, Mass., 3100 ft. of 8-in. pipe to the United States Cast Iron Pipe & Foundry Co. Attleboro, Mass., has rejected bids on 100 tons of 6-in. pipe. Milford, Mass., has bought from the Donaldson Iron Co. 75 tons of 8-in. pipe. Methuen, Mass., has closed bids on 100 tons of 6-in. stock, and another Massachusetts town is asking bids on 450 tons of 6, 8 and 10-in. Quite a few municipalities have placed business privately, the aggregate tonnage running into five figures. Competition among pipe makers is still keen. Prices quoted openly on domestic pipe are: 4 in., \$47.60 a ton, delivered common Boston freight rate points; 6 to 12 in., \$43.60 to \$44.10; 16 to 20 in., \$42.60 to \$43.10. The usual \$3 differential is asked on Class A and gas pipe.

**Reinforcing Bars.**—Sales the past week totaled about 1000 tons, all in small lots. No important tonnage is up for figuring, but attractive business is in the making. Prices are firmer, 100-ton and larger lots of cut lengths now being quoted from stock here at 2.66½c. per lb., base. Differentials on small lots bring the ex-

treme outside price up to 3.26½c. per lb., base.

**Old Material.**—Higher prices for heavy melting steel, scrap rails, skeleton, forge flashings, pipe and rails for rerolling have brought out increased offerings of these materials. Buying of heavy scrap and light material for export, coupled with a larger demand for machinery cast for New England consumption, and of stove plate at \$8 to \$8.50 a ton on cars, shipping point, and No. 2 machinery cast at \$10.50 a ton on cars, has added to the activity. A shortage of No. 1 heavy melting steel is reported in New England. The Boston & Albany Railroad today closes bids on 2000 tons of miscellaneous material, including 500 tons of No. 1 rails for rerolling, 500 tons No. 1 steel and 200 tons of scrap rails. Prices paid the

Boston Elevated Railroad last week on its list of scrap were in keeping with brokers' current quotations.

*Buying prices per gross ton, f.o.b. Boston rate shipping points:*

No. 1 heavy melting steel	\$12.75 to \$13.00
Scrap T rails	12.25 to 12.75
Scrap girder rails	12.00 to 12.25
No. 1 railroad wrought	12.25 to 12.50
No. 1 yard wrought	9.50 to 10.00
Machine shop turnings	6.50 to 7.00
Cast iron borings (steel works and rolling mill)	6.75 to 7.00
Bundled skeleton, long	9.50 to 10.00
Forge flashings	10.50 to 11.00
Blast furnace borings and turnings	6.50 to 6.75
Forge scrap	9.25 to 9.75
Shafting	14.50 to 14.75
Steel car axles	17.50 to 18.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	11.00 to 11.25
Rails for rolling	13.00 to 13.50
Cast iron borings, chemical	10.00 to 10.50
<i>Prices per gross ton deliv'd consumers' yards:</i>	
Textile cast	\$14.50 to \$15.00
No. 1 machinery cast	16.00 to 16.50
No. 2 machinery cast	14.00 to 14.50
Stove plate	11.50 to 12.00
Railroad malleable	17.50 to 18.00

## St. Louis

### Northern Pig Iron Prices Firm Despite Cut on Southern—Steel Demand Continues Active

ST. LOUIS, April 2.—The cut of \$1 a ton in the price of Southern iron has not affected the price of Northern iron, and the market continues firm, although the heavy sales of Southern makers has resulted in smaller orders for the Northern makers. The St. Louis Gas & Coke Corporation sold 5200 tons, including 600 tons to an Illinois implement maker, 500 tons to one Illinois melter and 700 tons to another, and 900 tons in scattering lots, all foundry for second quarter delivery, and 2500 tons of malleable to an Illinois melter, shipments of which will run into the third quarter. The Granite City maker's shipments continue heavy.

*Prices per gross ton at St. Louis:*

No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	
Granite City, Ill.	\$20.00
Malleable, f.o.b. Granite City	20.50
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	19.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

**Coke.**—The demand for foundry and furnace coke is heavy from the industries in this district. With warmer weather, there has been a marked falling off in buying of domestic grades.

**Finished Iron and Steel.**—The Granite City Steel Co. reports plates continue to be extremely active, and deliveries are becoming somewhat more extended. The demand for blue annealed sheets from car builders and small tank manufacturers is greater than the company's ability to produce. This situation is disappointing to many buyers who have been accustomed to ordering only when material was actually needed. The demand for galvanized sheets shows a noticeable improvement, and this department is being operated at a greater rate than

in several weeks. Structural fabricators report business quiet. The only reinforcing bar project in sight is 1300 tons for the Missouri Highway Commission.

**Old Material.**—The market for old material continues strong, with few changes in prices. Buying of steel grades by mills has been heavier during the last few weeks. Dealers report that little material is coming in from country yards, and railroad lists are light. The lists include: Union Pacific, 1774 tons; Big Four, 1400 tons; Missouri-Kansas-Texas, 617 tons; Missouri Pacific, 132 carloads; Chicago, Milwaukee, St. Paul & Pacific, 91 carloads; Mobile & Ohio, 32 carloads.

*Dealers' buying prices per gross ton, f.o.b. St. Louis district:*

No. 1 heavy melting or shoveling steel	\$13.50 to \$14.00
No. 2 heavy melting or shoveling steel	13.00 to 13.50
No. 1 locomotive tires	15.00 to 15.50
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart	15.25 to 15.75
Railroad springs	17.50 to 18.00
Bundled sheets	10.00 to 10.50
No. 2 railroad wrought	13.75 to 14.25
No. 1 busheling	10.25 to 10.75
Cast iron borings and shoveling turnings	9.75 to 10.25
Iron rails	15.00 to 15.50
Rails for rolling	16.50 to 17.00
Machine shop turnings	8.50 to 9.00
Heavy turnings	10.00 to 10.50
Steel car axles	20.50 to 21.00
Iron car axles	28.00 to 28.50
Wrot. iron bars and trans.	21.50 to 22.00
No. 1 railroad wrought	14.00 to 14.50
Steel rails, less than 3 ft.	16.50 to 17.00
Steel angle bars	15.00 to 15.50
Cast iron carwheels	15.50 to 16.00
No. 1 machinery cast	16.00 to 16.50
Railroad malleable	15.50 to 16.00
No. 1 railroad cast	15.00 to 15.50
Stove plate	13.50 to 14.00
Agricult. malleable	14.50 to 15.00
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

### Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex.	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
Per Cent Off List	
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

\*Including quantity differentials.



# Buffalo

## Small Lots of Pig Iron Booked at New Prices—Steel Mills Continue Heavy Operations

BUFFALO, April 2.—No large inquiry has come out to test pig iron prices, but the few small lots sold during the past week have been booked at the new figures. All of these lots were for delivery during the second quarter. So far as can be learned, no third quarter iron has been sold. One furnace interest has announced that it will not shade the Buffalo district price more than 50c. on Eastern business. Among the inquiries this week was one for 500 tons of malleable for immediate shipment and several 200 and 300-ton lots of foundry and malleable.

### Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25.	\$18.50 to \$19.50
No. 2X fdy., sil. 2.25 to 2.75	19.00 to 20.00
No. 1 fdy., sil. 2.75 to 3.25.	20.00 to 21.00
Malleable, sil. up to 2.25.	19.00 to 20.00
Basic .....	18.50
Lake Superior charcoal...	27.28

**Finished Iron and Steel.**—Local mills are keeping up the heavy operating schedules of the past few weeks. Bars, shapes, plates, sheets, nuts and bolts and wire goods are in active demand. Wire mills are operating at capacity. Production of mesh for use in building concrete roads is being increased. Reinforcing bar demand is heavy, and a great many small lots have been sold, but most of the sizable projects are still in the development stage. This condition applies also to structural steel jobs.

**Old Material.**—Some sales of short shoveling steel turnings have been made at \$12 to \$12.50. A sale of 1000 tons of cast iron borings at \$12.25 is reported. Stove plate is a little weaker, with one buyer out of the market until present supplies are exhausted. Sales of industrial and railroad malleable have been made at \$19.50. Steel foundries have paid \$20 for knuckles and couplers, coil and leaf springs and rolled steel wheels. A large Buffalo consumer has three boatloads (10,000 tons or more) of hydraulic compressed

### Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes.....	3.40c.
Soft steel bars.....	3.30c.
Reinforcing bars.....	2.75c.
Cold-fin. flats, sq. and hex.....	4.45c.
Rounds.....	3.95c.
Cold-rolled strip steel.....	5.85c.
Black sheets (No. 24).....	4.20c.
Galv. sheets (No. 24).....	4.85c.
Blue ann'd sheets (No. 10).....	3.50c.
Com. wire nails, base per keg.....	\$3.60
Black wire, base per 100 lb.....	3.75

sheets at Detroit, awaiting the opening of navigation. It hopes to land this scrap in Buffalo by April 15.

### Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.	\$17.50 to \$17.75
No. 2 heavy melting steel.	14.75 to 15.00
Scrap rails .....	17.00 to 18.00
Hydral. comp. sheets.....	14.75 to 15.00
Hand bundled sheets.....	12.00 to 12.50
Drop forge flashings.....	14.00 to 14.50
No. 1 busheling.....	16.50 to 16.75
Hvy. steel axle turnings.....	14.00 to 14.50
Machine shop turnings.....	7.75 to 8.00
No. 1 railroad wrought.....	13.50 to 14.00

Acid Open-Hearth	
Knuckles and couplers.....	19.50 to 20.00
Coil and leaf springs.....	19.50 to 20.00
Rolled steel wheels.....	19.50 to 20.00
Low phos. billet and bloom ends .....	20.00 to 20.50
Electric Furnace Grades	
Short shov. steel turnings.....	12.00 to 12.50
Blast Furnace Grades	
Short mixed borings and turnings.....	11.50 to 12.50
Cast iron borings.....	11.50 to 12.25
No. 2 busheling.....	10.00 to 10.50

Rolling Mill Grades	
Steel car axles.....	18.75 to 19.25
Iron axles .....	21.00 to 22.00

Cupola Grades	
No. 1 machinery cast.....	16.00 to 17.00
Stove plate .....	14.00 to 14.50
Locomotive grate bars.....	13.50 to 14.00
Steel rails, 3 ft. and under	19.50 to 20.00
Cast iron carwheels.....	14.00 to 14.50

Malleable Grades	
Industrial .....	19.00 to 19.50
Railroad .....	19.00 to 19.50
Agricultural .....	19.00 to 19.50

## Freight Rate Decisions and Complaints

In a proposed report to the Interstate Commerce Commission, made public last Saturday, Examiner J. J. Williams recommended dismissal of a complaint brought by the Wisconsin Bridge & Iron Co., North Milwaukee, Wis., holding that the joint fifth-class rate of 43c. per 100 lb. on structural steel from the Pittsburgh district to Alton, Ill., was applicable over the routes of movement other than those in which the Pennsylvania Railroad participated. The applicable rate over the latter line was held to be the combination rate of 62c. The complainant maintained that the rate should not exceed 40.5c. On the other hand the carriers sought to collect undercharges, contending that the combination rate of 62c., composed of the joint fifth-class rate of 37c. to North Milwaukee, where the steel was fabricated, and the commodity rate of 25c.

beyond was applicable. The examiner said that the railroads should promptly collect the outstanding undercharges. The fabrication-in-transit charge of 2c. per 100 lb. at North Milwaukee was not an issue.

Complaint has been filed with the Interstate Commerce Commission by the Alabama By-Products Corporation, the Gulf States Steel Co., the Central Iron & Coal Co., and the Woodward Iron Co., asking for the establishment from their plants in Alabama of "just, reasonable and non-discriminatory" joint rates on coke in carloads to destinations in Illinois, Indiana, Ohio and the southern peninsula of Michigan. The complaint pointed out that the carriers now maintain joint rates on coke from their plants to a number of consuming points in the destination territory involved, but that to many points no rates exist, except such as may be constructed on combination.

# Canada

## Increased Activities In Building Construction

TORONTO, ONT., April 2.—Prospective demand for spot pig iron continues large. Forward buying is quiet, the principal demand being for spot delivery. Strengthening in prices in United States markets, especially at Buffalo, is of interest to local blast furnace interests who are discussing higher prices. With Buffalo iron quoted at \$19 to \$19.50, the delivered prices at Toronto, with freight and duty, are \$25 and \$25.50, against the local quotation on Canadian iron of \$23.60.

### Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.....	\$23.60
No. 2 fdy., sil. 1.75 to 2.25.....	23.60
Malleable .....	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.....	\$25.00 to 25.50
No. 2 fdy., sil. 1.75 to 2.25.....	25.00 to 25.50
Malleable .....	25.00 to 25.50
Basic .....	24.00 to 24.50
Imported Iron, Montreal Warehouse	
Summerlee .....	\$33.50
Carron .....	33.00

**Structural Steel.**—Spring weather has brought increased activities in the building trades. As a result of the large demand for structural steel, additions are being made to some fabricating plants. The Dominion Bridge Co. has plans under way for expansion. The company will spend \$1,500,000 in the West, the first unit to be located at Burnaby, B. C. Structural steel awards in the past week were mostly in tonnages ranging from 50 to 500 tons, but these were in sufficient number to bring the total to several thousands of tons. Included in the projects for early closing are 2500 tons for an office building at Ottawa, Ont., for the Capital Trust Corporation, and 3000 tons for an addition to the Bell Telephone Co. Building in Toronto.

**Old Material.**—While there was little mill buying of steel scrap during

### Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-fin. rounds, shafting, screw stock .....	3.75c.
Black sheets (No. 24).....	4.25c.
Galv. sheets (No. 24).....	5.10c.
Blue ann'd sheets (No. 10).....	3.45c.
Black corrug. sheets (No. 24).....	4.30c.
Galv. corrug. sheets.....	5.15c.
Structural rivets .....	3.95c.
Boiler rivets .....	3.95c.
Per Cent Off List	
Tank rivets, 7/8-in. and smaller, 100 lb. or more .....	65
Less than 100 lb.....	60
Machine bolts .....	60
Carriage bolts .....	60
Lag screws .....	60
Hot-press. nuts, sq., blank or tapped. 200 lb. or more.....	60
Less than 200 lb.....	50
Hot-pressed nuts, hex., blank or tapped. 200 lb. or more.....	60
Less than 200 lb.....	50

the week, the market is strong. Iron grades are holding first place in Toronto and Montreal, although in the latter district there has recently developed a stronger call for heavy melting steel and turnings.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	\$9.50	\$8.00
Rails, scrap	10.00	9.00
No. 1 wrought	9.00	\$11.00 to 11.50
Machine shop turnings	7.00	5.00
Boiler plate	7.00	6.00
Heavy axle turnings	7.50	7.50
Cast borings	7.50	5.00
Steel turnings	7.00	6.50
Wrought pipe	5.00	6.00
Steel axles	14.00	20.00
Axles, wrought iron	16.00	22.00
No. 1 machinery cast	16.00 to 17.00	17.00
Stove plate	13.00	13.00
Standard carwheels	16.00	16.00
Malleable	13.00	13.00
	Per Net Ton	
No. 1 mach'y cast	\$15.00	....
Stove plate	9.00	....
Standard carwheels	13.00	....
Malleable scrap	13.00	....

## Electric Output Remains High

Production of electric power by public utility power plants in the United States in February is reported by the Geological Survey at 7444 million kw-hr., compared with 8239 in January and 7912 in December. The daily sendout was about the same in February as in January, and both were higher than ever before. Water-power provided 31.9 per cent of the February total, against 32.7 per cent in January and 34.9 per cent in December.

## Monroe, La.-St. Louis Gas Line Contracts Awarded

Contracts for steel pipe and machinery for the gas line to be built from Monroe, La., to St. Louis for the Mississippi River Fuel Corporation have been awarded by the Standard Oil Co. of New Jersey, which has a substantial interest in the project. The main line of 554 miles will be built of 22-in. pipe, which has been let as follows:

A. O. Smith Corporation, Milwaukee, 325 miles of 22 in., 5/16 in. thickness, electrically welded pipe; 124 miles of 22 in., 3/4 in. thickness, lap-welded pipe and 105 miles of 22 in., 11/32 in. thickness, lapwelded pipe, to National Tube Co. The Steel Corporation subsidiary will also furnish 25 miles of 16 in., 5/16 in. thickness, lapwelded pipe for a feeder line to extend from Richland, La., to Monroe, La. The total of these awards is about 115,000 tons.

Contract for crossings over the Arkansas, White and Mississippi rivers has been awarded to Ford, Bacon & Davis, Inc., New York, which will also supervise the construction of the entire project through sub-contractors, the Oklahoma Contracting Co., Fort Worth, Tex., which will build the northern half, and Williams Brothers, Tulsa, Okla., who will build the southern half. Eighteen engines of

1000 hp. each will be furnished by the Cooper - Bessemer Corporation, Mount Vernon, Ohio, and 12 pumps will be supplied by the Worthington Pump & Machinery Corporation. Five compression stations of 6000 hp. each will be built by the Standard Oil Co. of New Jersey.

## Electrochemists Announce Tentative Program

A tentative program has been prepared for the spring meeting of the American Electrochemical Society, to be held in Toronto, Canada, May 27 to 29. It is as follows:

**Monday, May 27:** "Electro-Magnetic Characteristics of Electrochemical Processes," Floyd T. Taylor, chairman. Discussion on "Present and Future of Canada's Electrochemical Industries." (Raw materials, transportation, markets, new products, new applications, etc.). R. A. Witherspoon, chairman. Symposium on "Modern Methods in Teaching Electrochemistry." Prof. Roy L. Dorrance, chairman. Illustrated address by Prof. Harry A. Curtis, of Yale University, on "The Nitrogen Fixation Factories of the World."

**Tuesday, May 28:** Electric furnaces, electro-reduction, corrosion, etc., with afternoon visits to industrial plants and informal smoker and entertainment in evening.

**Wednesday, May 29:** Electrodeposition Session, to be held jointly with the Toronto Branch, American Electroplaters' Society. (Iron, cadmium, chromium, etc.). Joint session with Canadian Chemical Association.

On Thursday, May 30, those desiring can take advantage of an excursion to the plant of the International Nickel Co. at Port Colborne. The headquarters of the convention will be at Toronto University, where all the sessions will be held and where most of the members and guests will reside during the convention.

## Atlanta Growing As An Automotive Center

The Chamber of Commerce of Atlanta, Ga., announces that the B. F. Goodrich Tire & Rubber Co. will build in that city a plant costing about \$1,500,000 for the manufacture of automobile tires. The Chevrolet and Ford companies are assembling automobiles in branch plants there, and the Fisher Body Corporation also has an Atlanta plant.

"In addition to the Goodrich plant, investigations are now being conducted by others in the automotive field, looking toward plants in Atlanta," says an item in *Forward Atlanta*, the publication of the Atlanta Chamber of Commerce. "One of these," it is stated, "will be announced shortly. Others may not be ready for some time, but very definitely it can be said that the whole automotive field is studying Atlanta, and that there is every expectation of tremendous expansion in this field in the near future."

## Railroad Equipment

### New York Central Orders 4500 Freight Cars

**F**REIGHT cars ordered during the week included 4500 for the New York Central and 500 for the Northern Pacific. Locomotive inquiries, amounting to 54, included 30 for the Chicago, Rock Island & Pacific. Details of the week's business follow:

New York Central has ordered 4500 freight cars, distributed as follows: 1000 box cars from American Car & Foundry Co., 1000 gondola cars from Pressed Steel Car Co., 500 gondola cars from General American Car Co., 1000 automobile box cars from Pullman Car & Mfg. Corporation and 500 box and 500 hopper cars from Standard Steel Car Co.

Northern Pacific has ordered 500 gondola cars from American Car & Foundry Co.

Chicago & North Western has made inquiry for 24 to 72 suburban coaches.

American Rolling Mill Co., Middletown, Ohio, is inquiring for five all-steel flat cars and five low-side gondola cars.

Pacific Fruit Express is inquiring for 600 refrigerator car underframes.

Anglo-Chilean Consolidated Nitrate Corporation, New York, is inquiring for 100 30-ton ore cars for export to Chile.

New York, Ontario & Western has ordered 10 4-8-2 type locomotives and six extra tenders from American Locomotive Co.

Southern Pacific is inquiring for eight 4-8-2 type locomotives and ten extra tenders.

Norfolk & Western will build 30 18,000-gal. locomotive tenders at its Roanoke, Va., shops.

Standard Oil Co. of Indiana is inquiring for one or two six-wheel switching locomotives.

Tientsin-Pukow, Tientsin, China, has ordered 10 2-8-2 type locomotives from Baldwin Locomotive Works.

Chicago, Rock Island & Pacific will buy 25 4-8-4 and five 4-8-2 type locomotives.

New York, Chicago & St. Louis will buy four Hudson type locomotives.

## Scrap in the Blast Furnace

A Buffalo district producer of pig iron calls attention to a statement in the Buffalo market report in *THE IRON AGE* of March 28 that blast furnaces in that district were using more scrap in their mixtures. The Buffalo producer states that while this may have been accurate as regards blast furnaces which make basic pig iron exclusively, it is not true of companies which produce foundry iron for the market, at least it is not true of that company's own practice.

"We advertise the fact that we use no scrap whatever in making foundry iron," the company writes. "It is not true that the blast furnaces in the Buffalo district use scrap in making merchant iron for foundry consumption, but it is true that blast furnaces making basic pig iron for use in open-hearth furnaces do use a certain percentage of scrap, but the amount of scrap that can be used is limited to about one car per day; at least, that is all the scrap we will consider using in the furnace which produces our basic pig iron."



# Non-Ferrous Metal Markets

## Copper Quiet But Firm, Tin Moderately Active, Lead Strong, Zinc Sales Large at Higher Prices

NEW YORK, April 2.

**Copper.**—The past week is the first in several in which prices have not advanced. But quotations are firm, with no prospect of an early decline. Electrolytic copper is quoted unchanged at 24c., delivered in the Connecticut Valley, and the official price of Copper Exporters, Inc., is 24.37½c., c.i.f. usual European ports. Owing to the Easter holidays here and abroad, demand has been light, and the market in the first two days of this month has shown very little life. It is expected that quiet will prevail at least until about the middle of the month, when March statistics are published. These may alter the complexion of the market. Sales for March are estimated at over 220,000,000 lb., of which about 125,000,000 lb. was to foreign consumers. Total sales are less than in January or February. Domestic consumers are well covered through July, but foreign melters have considerable metal yet to buy for June and some for May delivery. Inquiry for August from domestic users would naturally come at this time, but thus far very little interest has been shown. The probable course of prices is believed by some to be still upward, and there are predictions of 25c. copper. Lake copper is quiet but strong at 24c. to 24.12½c., delivered.

**Copper Averages.**—The average price of Lake copper for March, based on daily quotations in THE IRON AGE, was 21.68c., New York. The average price of electrolytic copper was 21.25c., refinery, or 21.50c., delivered in the Connecticut Valley.

**Tin.**—Sales of Straits tin for the week ended Saturday, March 30, were about 700 tons. This market was practically closed on Good Friday and the day following, with no transactions reported on those days. In other metals business was done. As in recent weeks, most of the buying last week was by consumers, although on a few days dealers were a little more active than usual. Prices have been within such a narrow range lately that dealers have been almost entirely out of the market. Consumers' purchases for several weeks have been mostly for nearby delivery. They are not buying ahead, partly because the premium for futures over spot has

### THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Apr. 2	Apr. 1	Mar. 30	Mar. 29	Mar. 28	Mar. 27
Lake copper, New York.....	24.12½	24.12½	24.12½	24.12½	24.12½	24.12½
Electrolytic copper, N. Y.*.....	23.75	23.75	23.75	23.75	23.75	23.75
Straits tin, spot, N. Y. ....	48.50	48.75	.....	.....	48.87½	48.87½
Zinc, East St. Louis.....	6.80	6.80	6.75	6.75	6.75	6.75
Zinc, New York.....	7.15	7.15	7.05	7.05	7.05	7.05
Lead, St. Louis.....	7.65	7.65	7.65	7.65	7.65	7.65
Lead, New York.....	7.75	7.75	7.75	7.75	7.75	7.75

\*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

### Rolled Products

Mill prices on brass and copper products have not changed since the advances of March 22. Lead full sheets have been quoted at 11.50c. to 11.75c. since March 22 and zinc sheets at 10c. since March 20.

### List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

<b>Sheets—</b>	
High brass .....	27.12½c.
Copper, hot rolled.....	33.75c.
Zinc .....	10.00c.
Lead (full sheets).....	11.50c. to 11.75c.
<b>Seamless Tubes—</b>	
High brass .....	32.00c.
Copper .....	35.12½c.
<b>Rods—</b>	
High brass .....	24.87½c.
Naval brass .....	27.50c.
<b>Wire—</b>	
Copper .....	25.87½c.
High brass .....	27.62½c.
<b>Copper in Rolls.....</b>	<b>32.75c.</b>
<b>Brazed Brass Tubing.....</b>	<b>35.12½c.</b>

### Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in.

wide .....

Tubes, base .....

Machine rods .....

### Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

<b>Sheets—</b>	<b>Base per Lb.</b>
High brass .....	27.12½c.
Copper, hot rolled.....	33.75c.
Copper, cold rolled, 14 oz. and heavier .....	36.00c.
Zinc .....	10.00c.
Lead, wide .....	11.90c.
<b>Seamless Tubes—</b>	
Brass .....	32.00c.
Copper .....	35.12½c.
<b>Brass Rods .....</b>	<b>24.87½c.</b>
<b>Brazed Brass Tubes.....</b>	<b>35.12½c.</b>

### New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

<b>Sheets—</b>	
High brass .....	27.12½c. to 28.12½c.
Copper, hot rolled, base sizes .....	33.75c. to 34.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes .....	37.00c. to 38.00c.
<b>Seamless Tubes—</b>	
Brass .....	32.00c. to 33.00c.
Copper .....	35.12½c. to 36.12½c.
<b>Brazed Brass Tubes.....</b>	<b>35.12½c. to 36.12½c.</b>
<b>Brass Rods .....</b>	<b>24.87½c. to 25.87½c.</b>

### New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks .....

Zinc sheets, open.....

### Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	51.00c. to 52.00c.
Tin, bar .....	53.00c. to 54.00c.
Copper, Lake .....	25.00c.
Copper, electrolytic .....	24.75c.
Copper, casting .....	24.50c.
Zinc, slab .....	8.00c. to 8.50c.
Lead, American pig.....	8.75c. to 9.25c.
Lead, bar .....	10.75c. to 11.25c.
Antimony, Asiatic .....	11.50c. to 12.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) .....	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy, .....	24.00c. to 25.00c.
Babbitt metal, commercial grade, .....	30.00c. to 40.00c.
Solder, ½ and ¼ .....	32.25c. to 33.25c.

### Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	53.75c.
Tin, bar .....	55.75c.
Copper, Lake .....	25.75c.
Copper, electrolytic .....	25.38c.
Copper, casting .....	25.25c.
Zinc, slab .....	8.00c.
Lead, American pig.....	8.50c. to 8.75c.
Lead, bar .....	10.50c.
Antimony, Asiatic .....	16.00c.
Babbitt metal, medium grade.....	19.50c.
Babbitt metal, high grade.....	57.75c.
Solder, ½ and ¼ .....	34.00c.

### Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	18.25c.	20.25c.
Copper, hvy. and wire .....	18.00c.	20.00c.
Copper, light and bottoms .....	16.50c.	18.50c.
Brass, heavy .....	11.50c.	12.50c.
Brass, light .....	9.50c.	11.00c.
Hvy. machine composition .....	13.25c.	15.00c.
No. 1 yel. brass turnings .....	11.50c.	12.50c.
No. 1 red brass or compos. turnings.....	12.25c.	13.50c.
Lead, heavy .....	6.25c.	6.75c.
Lead, tea.....	5.00c.	5.50c.
Zinc .....	3.50c.	4.00c.
Sheet aluminum.....	13.50c.	15.50c.
Cast aluminum.....	12.00c.	14.00c.



been very small, and also because, based on recent developments, they have faith in the continued stabilization of prices. In the first two days this month business was light, London having been closed yesterday, Easter Monday. Spot Straits tin was quoted today at 48.50c., New York. In the London market today, the first market day since Thursday, March 28, quotations were little changed from those of a week ago. They were as follows: Spot standard, £219 10s.; future standard, £220 7s. 6d.; spot Straits, £221. The Singapore price today was £223, with sales in the East 600 tons, supplementing 425 tons on March 28 and 275 tons on March 27. This indicates the continued free movement of tin from that quarter. Statistics for March show that deliveries into consumption were exceedingly large at 8175 tons. On March 31, 2550 tons was in stock and landing. The data for the world's visible supply are not yet available, but estimates show that the decrease in March from February was about 150 tons. It is authoritatively figured that Straits shipments in April will be about 9000 tons, which is very large.

**Lead.**—April opens with strong demand for lead, particularly for May delivery, and sales have been heavy. There has been some inquiry for June, but no sales are reported. Prices are firm at 7.65c., St. Louis, in the outside market, with the quotation of the leading interest unchanged at 7.75c., New York, as the contract price.

**Zinc.**—Backed by strong demand and heavy sales, prices have worked higher, and prime Western is now on a firm basis at 6.80c., East St. Louis, or 7.15c., New York. Sales exceeded

20,000 tons in one week and have been large since the advance started from 6.35c. Fundamental conditions are stated to be better than they have been in some time. Last week ore prices were again advanced, this time \$1.50 a ton to \$44, Joplin, and smelters bought quite liberally, taking about 14,430 tons. Shipments were also large at over 14,100 tons, so that, although production was heavy at about 14,500 tons, ore stocks are still small at an estimated total of 16,923 tons.

**Antimony.**—Chinese antimony is very quiet and quoted a little easier at 9.62½c., duty paid, for all positions.

**Nickel.**—Ingot and shot nickel in wholesale lots are quoted unchanged at 35c. and 36c. per lb. respectively. Electrolytic nickel in cathodes is quoted at 35c. per lb.

**Aluminum.**—Virgin metal, 98 to 99 per cent pure, is unchanged at 23.90c. per lb., delivered.

#### Non-Ferrous Metals at Chicago

**CHICAGO, April 2.**—This market is less active than last week. Inquiry for forward consumption is in moderate volume and spot buying is quiet. The old metal market is dull, but prices are holding.

*Prices per lb., in carload lots:*

Lake copper, 24.50c.; tin, 49.75c.; lead, 8.10c.; zinc, 6.95c.; in less-than-carload lots: antimony, 10.75c. On old metals we quote copper wire, crucible shapes and copper clips, 16.50c.; copper bottoms, 14.50c.; red brass, 14.12½c.; yellow brass, 11c.; lead pipe, 6c.; zinc, 3.62½c.; pewter, No. 1, 27.62½c.; tin foil, 27.62½c.; block tin, 40.12½c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

## Reinforcing Steel

### New York Subways Take 2000 Tons

**A**WARDS during the week amounted to nearly 8000 tons, one of the largest totals this year, and included 2000 tons for four sections of the New York subway. With 1300 tons required for Missouri State highway work, new projects totaled 3600 tons. Awards follow:

**NEW YORK, 1250 tons,** subway sections 1 and 2, route 110; from Carleton Co., Inc., general contractor, to McClintic-Marshall Co.

**NEW YORK, 750 tons,** subway sections 1 and 2, route 103; from Corson Construction Co., general contractor, to Concrete Steel Co.

**BROOKLYN, 120 tons,** subway station work; from Carlo Petrillo, general contractor, to Capitol Steel Co., Brooklyn.

**JERSEY CITY, 350 tons,** public school No. 22; from D'Elia Contracting Co., general contractor, to Kalman Steel Co.

**BAYONNE, N. J., 500 tons,** New Jersey approach to Kill van Kull bridge; reported placed by P. T. Contracting Co., with Day & Goater, Inc.

**WANAQUE, N. J., 100 tons,** pipe line

project, to Joseph T. Ryerson & Son, Inc.

**PHILADELPHIA, 400 tons,** warehouse for Sears, Roebuck & Co., to Concrete Steel Co.

**CAMDEN, N. J., 450 tons** of rail steel bars, building for Arundel Mfg. Co., to Taylor-Davis, Inc.

**STATE OF NORTH CAROLINA, 100 tons,** highway work, to Connors Steel Co.

**NEW ORLEANS, 500 tons,** factory for American Can Co., to Concrete Steel Co.

**CHICAGO, 1230 tons;** 230 tons for footing for Damon Street bridge, to Joseph T. Ryerson & Son, previously reported to another bidder; 1000 tons for superstructure, to Kalman Steel Co.

**CHICAGO, 100 tons,** apartment building at 637 Aldine Avenue, to Concrete Engineering Co.

**CHICAGO, 800 tons,** building for Chicago Mail Order Co., to Barton Spiderweb System.

**CHICAGO, 150 tons,** store and hotel at 101 West Division Street, to Inland Steel Co.

**CHICAGO, 900 tons,** building for Olson Rug Co., to American System of Reinforcing; previously reported to an unnamed bidder.

**GREEN BAY, WIS.,** tonnage not stated, theater, to American System of Reinforcing.

**MILWAUKEE, 350 tons** for Chicago & North Western Railroad, to an unnamed bidder.

**TOMAH, WIS., 100 tons** for Chicago, Milwaukee, St. Paul & Pacific, to American System of Reinforcing.

**SALEM, ORE., 125 tons,** bridge over Mill Creek; general contract to F. Odom, Salem.

**LONG BEACH, CAL., 168 tons,** store at Broadway and Locust Street, to unnamed interest.

**LOS ANGELES, 185 tons,** hospital on South Flower Street, to unnamed bidder.

**SEATTLE, 300 tons,** piers for Longview bridge, to Northwest Steel Rolling Mills.

**PITTSBURG, CAL., 118 tons,** cannery for Booth Co., to Soule Steel Co.

**EMERYVILLE, CAL., 525 tons,** plant for Western Electric Co., to Soule Steel Co.

#### Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

**PHILADELPHIA, 200 tons,** Market Street subway under City Hall.

**CLEVELAND, 100 tons,** Ohio Bell Telephone Building.

**CHICAGO, tonnage** being estimated, apartment building at 5000 Cornell Avenue.

**CHICAGO, 300 tons,** apartment building at 701 East End Avenue; Carl Sharpago, architect.

**JEFFERSON CITY, MO., 1300 tons** for Missouri Highway Commission; paving, 900 tons, bridges and culverts, 400 tons.

**BELLINGHAM, WASH., 185 tons,** hotel; bids received.

**SEATTLE, 500 tons,** addition to city-county building; bids April 12.

**SAN FRANCISCO, 490 tons,** school, Arguello Boulevard; bids April 3.

**HONOLULU, 500 tons,** office, garage and warehouses for Dillingham Transport Co.; bids April 13.

## A.S.T.M. Research Fund Growing

Gratifying progress is reported as having been made in the last year in developing the research fund of the American Society for Testing Materials. This fund, which is known as the A. S. T. M. Research Fund, at the beginning of 1928 totaled \$3,000. Following the policy of adding each year not less than one-half of the entrance fees during the year, close to \$1,500 has been added to the fund from this source. Besides this, the executive committee allocated \$1,500 of the 1928 operating surplus, bringing the fund to \$6,000, now invested in long-term bonds.

According to the *Bulletin* of the society, although the fund is as yet of quite modest proportions, it is expected to grow steadily, and the executive committee is confident that other additions will be made from time to time by those who recognize the wisdom of having the society initiate and support studies of the properties of engineering materials, for it is upon knowledge so obtained that better utilization of materials depends. The fund is even now sufficient to lend some assistance in initiating research projects, and the executive committee has set aside the income for the coming year for such use as the committee on correlation of research may recommend.

# Fabricated Structural Steel

## Awards of 84,300 Tons Include 22,300 for Subways and 13,000 Tons for Office Building in New York

**A**WARDS reported during the week amounted to 84,300 tons, the largest total of the year and nearly twice the average of the last several weeks. Outstanding tonnages placed were 22,300 tons for three sections of the New York subway system, 13,000 tons for a New York office building and 7000 tons for a Cleveland bank building. New projects reported will require slightly more than 9000 tons, one of the lowest totals of the year. Awards follow:

CAMBRIDGE, 140 tons, Harvard Business School administration building addition, to New England Structural Co.  
 PROVIDENCE, R. I., 125 tons, Providence National Bank building, to Tower Iron Works.  
 PROVIDENCE, 520 tons, Nurses' Home and hospital addition, to Providence Steel & Iron Co.  
 NASHUA, N. H., 100 tons to Eastern Bridge & Structural Co.  
 BRIDGEWATER, MASS., 100 tons, power house for State School, to Eastern Bridge & Structural Co.  
 ROYALTON, VT., 100 tons, bridge, to Pittsburgh-Des Moines Steel Co.  
 BROOKLINE, MASS., 120 tons, country club indoor tennis courts, to Boston Bridge Works, Inc.  
 BOSTON & MAINE RAILROAD, 140 tons, two bridges, to Boston Bridge Works, Inc.  
 STATE OF VERMONT, 375 tons, highway bridge; 275 tons to Berlin Construction, Inc., and 100 tons to Palmer Steel Co.  
 NEW YORK, 14,100 tons, subway sections 1 and 2, route 110; from Carleton, Inc., general contractor, to American Bridge Co.  
 NEW YORK, 13,000 tons, office building at 114 Wall Street, to Levering & Garrigues Co.  
 NEW YORK, 3000 tons, building at Canal and Varick Streets, to McClintic-Marshall Co.  
 NEW YORK, 1500 tons, loft building at Second Avenue and Forty-third Street, to Paterson Bridge Co.  
 NEW YORK, 1000 tons, loft building at 323 West Thirty-eighth Street, to Taylor-Fichter Steel Construction Co.  
 NEW YORK, 900 tons, addition to building for New York Steam Corporation, to Post & McCord, Inc.  
 NEW YORK, 750 tons, hotel at 328 East Fifty-sixth Street, to Taylor-Fichter Steel Construction Co.  
 NEW YORK, 730 tons, loft building at Seventh Avenue and Thirty-fourth Street, to McClintic-Marshall Co.  
 NEW YORK, 700 tons, addition to public school No. 102, to Harris Structural Steel Co.  
 NEW YORK, 400 tons, apartment building at 309 East Thirty-fifth Street, to Levering & Garrigues Co.  
 NEW YORK, 8200 tons, subway section 7, route 109; from Hart & Early Co., Inc., general contractor, to McClintic-Marshall Co.  
 NEW YORK, 360 tons, public school No. 133, to Lehigh Structural Steel Co.  
 NEW YORK, 3300 tons, Textile High School, to Easton Structural Steel Co.  
 NEW YORK, 180 tons, Home for Aged on Amsterdam Avenue, to Post & McCord, Inc.  
 NEW YORK, 500 tons, 48-in. water pipe for 111th Street, to American Locomotive Co.  
 BROOKLYN, 1275 tons, trade school for girls, to A. E. Norton, Inc.  
 BROOKLYN, 200 tons, addition to National City Bank in Montague Street, to Lehigh Structural Steel Co.  
 IONA ISLAND, N. Y., 500 tons, tanks, to Melrose Contracting Co., New York.

BARRYTOWN, N. Y., 550 tons, St. Joseph's Institute, to Bethlehem Steel Co.  
 BINGHAMTON, N. Y., 500 tons, First National Bank, to Lehigh Structural Steel Co.  
 CARNEYS POINT, N. J., 500 tons, tetra-ethyl plant for Du Pont Engineering Co., to Belmont Iron Works.  
 PHILADELPHIA 250 tons, warehouse for Edgecombe Steel Co., to Jones & Laughlin Steel Corporation.  
 PHILADELPHIA, 600 tons, power plant for Atwater Kent Mfg. Co., to Shoemaker Bridge Co.  
 PHILADELPHIA 1400 tons, warehouse for Pennsylvania Railroad, to McClintic-Marshall Co.  
 BALTIMORE, 500 tons, highway bridge, to American Bridge Co.  
 STATE OF VIRGINIA, 700 tons, highway bridge, to Dewey Brothers.  
 MONTGOMERY, ALA., 175 tons, Woman's College building, to Nashville Bridge Co.  
 ANNISTON, ALA., 125 tons, addition to Southern Manganese Corporation plant, to Ingalls Iron Works Co.  
 BIRMINGHAM, 2150 tons, Jefferson County Court House, to Ingalls Iron Works Co.  
 BIRMINGHAM, 260 tons, bridges for Southern Pacific Railroad, to Virginia Bridge & Iron Co.  
 GREENVILLE, MISS., 450 tons, plant of Chicago Mill & Lumber Co., to Ingalls Iron Works Co.  
 STATE OF TEXAS, 240 tons, highway bridges, to Virginia Bridge & Iron Co.  
 MIAMI, FLA., 170 tons, airplane hangar, to Virginia Bridge & Iron Co.  
 NEW ORLEANS, 250 tons, criminal courts building, to Ingalls Iron Works Co.  
 REPUBLIC OF PANAMA, 110 tons, theater, to Ingalls Iron Works Co.  
 SHARON, PA., 150 tons, high school, to Niles Forge & Mfg. Co.  
 CINCINNATI, 250 tons, building for Sisters of Mercy, to L. Schreiber & Sons Co.  
 DAYTON, OHIO, 2000 tons, addition for National Cash Register Co., to Dayton Structural Steel Co.  
 LOUISVILLE & NASHVILLE RAILROAD, 600 tons, bridges, to Virginia Bridge & Iron Co.  
 LOUISVILLE, KY., 1500 tons, four combination tank and cargo river barges for American Barge Line, to Howard Shipyards & Dock Co., Jeffersonville, Ind.  
 COPPERHILL, TENN., 100 tons, addition for Tennessee Copper Co., to Ingalls Iron Works Co.  
 TORONTO, ONT., 525 tons, Community market building, 425 tons; store, 100 tons, to John T. Hepburn, Ltd., Toronto.  
 FORD, ONT., 100 tons, garage, to Canadian Bridge Co., Walkerville, Ont.  
 HAMILTON, ONT., 150 tons, addition for Steel Co. of Canada Ltd., to Hamilton Bridge Co.  
 DETROIT, 675 tons, substation for Detroit-Edison Co., to McClintic-Marshall Co.  
 DETROIT, 500 tons, Exchange Building for Michigan Bell Telephone Co., to Whitehead & Kales Co.  
 JACKSON, MICH., 330 tons, building for Sparks-Withington Co., to Whitehead & Kales Co.

CLEVELAND, 7000 tons, Midland Bank building for Cleveland Terminals Building Co., to American Bridge Co.

DEKALB, ILL., 150 tons, building for Rochelle Canneries, to Mississippi Valley Structural Steel Co.

CHICAGO, 350 tons, substation for Commonwealth Edison Co., to Duffin Iron Co.

CHICAGO, 1900 tons, Marshall High School, to New City Iron Works, local.

SPRINGFIELD, ILL., 150 tons, post office and court building, to Rochester Bridge Co.

DODGE CITY, IOWA, 350 tons, building for International Harvester Co., to Des Moines Structural Steel Co.

MILWAUKEE, 1600 tons, pipe plant for A. O. Smith Corporation, to Wisconsin Bridge Co.

MILWAUKEE, 300 tons, crane runway for A. O. Smith Corporation, to Wisconsin Bridge Co.

MILWAUKEE, 300 tons, transfer bridge for municipal car ferry terminal, to J. C. Theilacker, Milwaukee.

DENVER, 1300 tons, city and county building, to E. Burkhardt & Sons.

INTERNATIONAL FALLS, UTAH, 450 tons, building for M. & O. Paper Co., to Minneapolis Steel & Machinery Co.

LOS ANGELES, 200 tons, store, Hollywood Boulevard and Cherokee Street, to Consolidated Steel Corporation.

FAIRFAX, CAL., 600 tons, hotel, to Judson-Pacific Co.

SEATTLE, 1505 tons, West Spokane Street bridge, to Wallace Bridge & Structural Steel Co.

### Structural Projects Pending

Inquiries for fabricated steel work include the following:

GREENFIELD, MASS., 113 tons, bank.  
 NEW YORK, 1000 tons, loft building in West Thirty-fourth Street.  
 PENNSYLVANIA RAILROAD, 700 tons, bridges.  
 BALTIMORE & OHIO RAILROAD, 300 tons, bridges.  
 PHILADELPHIA, 1400 tons, building for University Club.  
 WASHINGTON, 16,000 tons, building for Department of Commerce; Consolidated Engineering Co., Baltimore, low bidder on general contract.  
 CHARLESTON, W. VA., 2700 tons, highway bridge; bids April 10.  
 LOUISVILLE, 600 tons, warehouse for Brown & Williamson Tobacco Co.  
 NEWPORT, KY., 1000 tons, mill building.  
 YOUNGSTOWN, 150 tons, repairs for McGuffey Street viaduct.  
 GRAND RAPIDS, MICH., 200 tons, building for Sears, Roebuck & Co.  
 CHICAGO, tonnage not stated, planetarium to be constructed in Grand Park.  
 SHEBOYGAN, WIS., 200 tons, viaduct at South Fourteenth Street; plans by Klug & Smith Co., Milwaukee, bids this month.  
 OAKLAND, CAL., 445 tons, warehouse for Port Commission; bids April 1.  
 SIERRA MADRE, CAL., 240 tons plates, 4 to 16-in. welded, riveted or cast iron pipe; bids April 9.

J. M. & L. A. Osborn Co., Cleveland, on April 1 will open a warehouse in Detroit at Gratiot Avenue and Bellevue Street. Sheet metal, tin plate, copper and other products will be handled.



## PERSONAL

J. R. EDWARDS has resigned as manager of sales, Erie City Iron Works, Erie, Pa., and will engage in business on his own account as a sales agent of the Transue & Williams Steel Forging Corporation, Alliance, Ohio; the Tyler Tube & Pipe Co., Washington, Pa., and the Neely Nut & Bolt Co., Pittsburgh.

DANIEL C. SAYRE, Massachusetts Institute of Technology, Cambridge, Mass., spoke on "New Developments in Airplane Design Features," at a meeting of the Providence Engineering Society, Providence, R. I., on April 2.

R. W. SHORE and L. S. LOVE, for many years identified with the machine tool trade in New York, and J. G. SPARKS, recently manager of the Waverly Musical Products Co., Long Island City, N. Y., have formed a new company—Pressed Products, Inc., which has leased manufacturing space at 36-20 Thirty-fourth Street, Long Island City, and will engage in metal stampings work on contract. Mr. Sparks, who was at one time in the engineering department of the Tennessee Coal, Iron & Railroad Co. and who, during the war, was with the Standard Scientific Co., New York, which was engaged in designing scientific instruments for the Government, is president of the new company. Mr. Shore is vice-president and Mr. Love is secretary-treasurer. The company will specialize in light and medium stampings in brass and steel, having a range of presses with capacities up to 70 tons. Funk & Shore, 50 Church Street, New York, are selling agents for the plant.

LOUIS RASMUSSEN, general superintendent Nash Motors Co., Kenosha, Wis., discussed the making of castings at the Nash plant at a meeting of the Wisconsin Gray Iron Foundry Group in Milwaukee on April 3.

AUGUST A. BUSCH, who has been president of the Busch-Sulzer Brothers-Diesel Engine Co., St. Louis, was elected chairman of the board of that company on March 28. He is succeeded as president by EDWARD B. POLLISTER, who was formerly second vice-president of the company and who will continue to act as general manager. C. DRUMMOND JONES, fourth vice-president and secretary and treasurer of the company, succeeds Mr. Pollister as second vice-president and will continue in his former capacities.

G. W. QUICK has been made general manager of the General Pressed Steel Co., Newton Falls, Ohio, having resigned as sales engineer for the Youngstown Pressed Steel Co., War-

ren, Ohio. J. W. FRENCH has resigned as chief inspector of the Youngstown Pressed Steel Co. to become assistant to Mr. Quick in his new position.

B. H. WITHERSPOON has been elected president of the Pittsburgh Testing Laboratory, Pittsburgh, inspecting engineers and chemists, and A. R. ELLIS, vice-president in charge of operations. Mr. Witherspoon was formerly district manager of the Remington-Rand Business Service, Inc., in Los Angeles.



B. H. WITHERSPOON



A. R. ELLIS

He is a graduate of the University of Wisconsin. Mr. Ellis has been affiliated with the Laboratory since 1910, and has been general manager and director since 1921. He is a graduate of the College of Engineering, Cornell University.

R. B. KOONTZ, who has been secretary and treasurer of the Adamson Machine Co., Akron, Ohio, since its incorporation in 1909, has been elected president and general manager of the company, succeeding the late Alexander Adamson. L. C. FENN, formerly as-

sistant treasurer, has been named secretary and treasurer, and L. S. DUDLEY, assistant secretary and assistant treasurer. W. E. SLABAUGH has succeeded Mr. Adamson on the board of directors.

J. R. DAWSON, metallurgical engineer, Union Carbide & Carbon Research Laboratories, Inc., Long Island City, N. Y., will speak at a joint meeting of the Boston chapters of the American Society for Steel Treating and the American Welding Society which is to be held in connection with a plant visitation at the Fore River plant, Bethlehem Shipbuilding Corporation, Ltd., Quincy, Mass., on Friday, April 5. Mr. Dawson's subject will be "Fusion Welding."

EDWARD J. HOLLJES has been appointed sales manager for William Sellers & Co., Inc., Philadelphia, manufacturer of heavy machine tools and locomotive injectors. He has been associated with the company since 1909 and has been directing its sales for a number of years. Following his graduation in 1908 from Lehigh University he took a special apprentice course in the shops of the Baldwin Locomotive Works, Philadelphia. He first covered the Southeast territory for the Sellers company and later became its special traveling representative. In 1921 he was sent to Europe as Sellers representative, and visited most of the important countries in the company's interests.

ERNEST P. GOODRICH, consulting traffic engineer, 175 Fifth Avenue, New York, has been retained as engineering adviser by the Chinese Nationalist Government. This will necessitate his being absent from the United States each year, but will not interfere with his consulting work for American and European clients. He has arranged an association with WILLIAM B. POWELL, Buffalo, consulting traffic engineer, who will conduct street traffic and related studies with Mr. Goodrich. Mr. Powell is chairman of the American Engineering Council and of the American Engineering Standards Committee on Signs, Signals and Markings.

MELVIN W. ELLIS, president, Hart Parr Tractor Co., Charles City, Iowa, is president of the Oliver Farm Equipment Co., which was recently formed by a consolidation of the Hart Parr company, the Oliver Chilled Plow Works, South Bend, Ind., and the Nichols & Shepard Co., Battle Creek, Mich. J. D. OLIVER, president of the Oliver organization, is chairman of the board of the new company, and LEWIS J. BROWN, president, Nichols & Shepard Co., is executive vice-president.

WALTER E. SJODEN has been appointed manager of the Birmingham plant of the American Radiator Co., succeeding the late A. D. Nichols. Mr. Sjoden has been with the Radiator



company for 15 years, for the last two years as superintendent of the North Birmingham plant. Previously he was superintendent of the plant at Titusville, Pa.

ROBERT C. GOOD, district representative at Pittsburgh for the Electro Metallurgical Sales Corporation, 30 East Forty-second Street, New York, has been appointed metallurgical engineer for that company, succeeding R. S. POISTER. His headquarters will be continued at the Pittsburgh office, 816 Oliver Building. Mr. Good was



R. C. GOOD

graduated in metallurgical engineering from Lehigh University, Bethlehem, Pa., and has had several years of practical experience in the metallurgy of iron and steel.

LUDWELL H. GILMER, founder and chairman of the board of the L. H. Gilmer Co., Tacony, Philadelphia, has severed his connection with that company, except as a director, to head a new company, to be known as the Gilmer Corporation, for the manufacture of endless belts. The new company will have headquarters at Detroit and factory at Auburn, Ind., where it is planned to start production on April 15. Attention will be centered at present on automobile fan belts and other molded rubber products.

EDWARD B. J. CARROLL is now associated with the Great Lakes Foundry Sand Co., Detroit, in charge of sales and service in the Ohio territory. He has had considerable foundry experience under the direction of his father, J. J. CARROLL, president, Gartland-Carroll Foundry Co., Sandusky, Ohio, and recently completed special courses in foundry subjects at Rutgers and Notre Dame universities.

G. H. KUECHLER will have charge of an office which is being opened at 2702 Eaton Tower, Detroit, by Thomas E. Murray, Inc., designing and consulting engineer, 88 Lexington Avenue, New York.

A. E. STALEY, JR., has been elected executive vice-president of the A. E. Staley Mfg. Co., Decatur, Ill., a newly created position. In his new capacity he will relieve his father, A. E. STALEY, SR., president of the company, from many responsibilities and details in connection with plant operations and have general charge of all plants.

L. E. GULLIFORD, formerly general superintendent, McMyler-Interstate Co., Cleveland, has become associated with the Pulaski Foundry & Mfg. Corporation, Pulaski, Va., as general manager. He had been identified with the McMyler-Interstate Co. for approximately 17 years and has been engaged in the heavy machinery and construction industry for more than 25 years.

SAMUEL M. VAUCLAIN, since 1919 president of the Baldwin Locomotive Works, Philadelphia, has been elected chairman of the board of the company, succeeding THOMAS S. GATES, who has been named chairman of the executive committee. At the time of the election it was stated that Mr. Vauclain would continue actively to participate in the company's affairs and to remain in intimate contact with the transportation business of the United States and foreign countries. GEORGE H. HOUSTON has been elected president of the company. He is a member of the firm of Fisher & Co., 52 Wall Street, New York, and is an associate of the Fisher Brothers of Detroit. Mr. Houston was born at Covington, Ky., in 1883 and attended the Cincinnati Technical Institute. He is a member of the American Society of Mechanical Engineers and the Society of Automotive Engineers.

J. C. MCDUGALL has been appointed district sales agent in Washington, Oregon and Alaska for the Roller-Smith Co., 233 Broadway, New York. His headquarters are in the Alaska Building, Seattle. CARL P. LOHR, 401 National Bank of Commerce Building, St. Louis, will serve the company in a similar capacity in the St. Louis territory.

I. E. WALTON, formerly assistant sales manager, Heppenstall Forge & Knife Co., Pittsburgh, has been appointed purchasing agent for that company. He has been in its employ for 12 years.

CHARLES THORTON, assistant superintendent of coke ovens at the Steelton, Pa., plant, Bethlehem Steel Co., has been appointed superintendent. He succeeds B. W. WINSHIP, who had been in charge of the ovens since 1916, and now assumes a similar position at the Lackawanna, N. Y., plant of the company.

ERWIN A. RENFER has been made superintendent of the Kenosha, Wis., mills of the Anaconda Copper Mining Co. For the past few years he has been assistant superintendent of the

Great Falls, Mont., rolling mills of that company. He was at one time employed at the Waukegan, Ill., plant of the American Steel & Wire Co.

W. A. ROWE and PHILIP A. SMITH have been elected directors of the Osborn Mfg. Co., Cleveland. Mr. Rowe has also been made vice-president and treasurer, and Mr. Smith, assistant secretary and factory manager of the brush division. C. W. TITGEMEYER has been elected vice-president in charge of brush division sales, and R. W. HISEY, secretary and factory manager of the machine division. E. F. OYSTER has been appointed chief engineer; JOHN D. WISE, assistant sales manager, machine division; R. B. JONES, assistant sales manager, brush division, and LLOYD H. WEBER, assistant advertising manager.

J. C. LINCOLN, who has been president of the Lincoln Electric Co., Cleveland, has been made chairman of the board of directors, and has been succeeded by J. F. LINCOLN, for-



J. F. LINCOLN

merly vice-president. The latter has been general manager of the company since 1912. J. C. LINCOLN's new duties will afford him additional time to devote to electrical research and experimental development work, which have been his major interests for several years.

C. H. BRADLEY, formerly chief engineer of the Variety Iron & Steel Works Co., Cleveland, has been appointed manager of the industrial division of the American Shipbuilding Co., Cleveland.

VERNON W. WELLS, Carborundum Co., Niagara Falls, N. Y., will deliver a paper on production grinding methods, and RUSSELL PURCELL, welding engineer, Indianapolis Power & Light Co., Indianapolis, will speak on electric arc and autogenous welding at a meeting of the Indianapolis Chapter of the American Society for Steel Treating on Monday evening, April 8.

JOHN G. COTTLE, for a number of years attached to the Chicago sales

staff of the Reading Iron Co., Reading, Pa., has been appointed railroad sales representative in the Chicago and Western territory, succeeding H. L. SHEPARD, who has resigned. O. L. MCGINN has been added to the company's Chicago sales organization. H. D. POLLARD has been placed in charge of an office which has been established by the Reading company at 402 Mutual Building, Kansas City, Mo.

R. D. PHELPS, Francis & Nygren Foundry Co., Chicago, a member of the Gray Iron Institute research committee, has been appointed as the representative of the institute on the American Foundrymen's Association gray iron committee, and JOHN D. MILLER, Cresson-Morris Co., Philadelphia, has been named as the institute representative on the American Society for Testing Materials committee D-3 on cast iron. ARTHUR J. TUSCANY, manager of the institute, announces that its various committees will hold meetings during the convention of the American Foundrymen's Association at the Stevens Hotel, Chicago, April 8 to 11.

HENRY E. C. HILL, purchasing agent, North & Judd Mfg. Co., New Britain, Conn., will sail on April 6 for a three months' visit to his former home in England.

JOHN F. TINSLEY, vice-president and general manager, Crompton & Knowles Loom Works, Worcester, Mass., has been made a member of the American International Committee by Ambassador Padilla of Spain, to act in an advisory capacity for the coming exposition at Barcelona, Spain, to open May 5, and continue for several months.

## Propose National Museum of Engineering and Industry

A bill was introduced into the last Congress and will be reintroduced into the next one proposing the creation of a commission on a National Museum of Engineering and Industry which shall be authorized to investigate the feasibility of establishing such a museum. This would take the place of the Arts and Industries Building and the National Museum in Washington, which are to be demolished. The bill proposes that the commission be composed of nine persons to be appointed by the President, as follows: An engineer, an industrial chemist, a manufacturer, three persons experienced in transportation by land, water and air respectively, an educator, a representative of labor and a museum expert. Action on the above mentioned bill is being urged by the National Museum of Engineering and Industry, an organization started a few years ago to put through such a project. H. F. J. PORTER, 17 East Forty-second Street, New York, is secretary.

## OBITUARY

JOHN EDWARD JENNINGS, vice-president, Milliken Brothers-Blaw-Knox Corporation, New York, export subsidiary of the Blaw-Knox Co., Pittsburgh, died suddenly on March 27, at his home in New York. He had recently returned from Pinehurst, N. C., where he had been recuperating from influenza. Mr. Jennings was born in Brooklyn in 1875, and was graduated from Cooper Union in 1896. He became connected with the structural steel concern of Milliken Brothers, New York, and spent the remainder of his career in structural steel and iron work. He was a pioneer in the development of structural steel towers for high-tension electric transmission systems, having designed and supervised the manufacture of such units for important systems in all parts of the world, including installations for the governments of Norway and Australia, and for leading interests in the United States, England and other countries. Mr. Jennings was also prominently identified with the development of structural steel towers for radio service, special steel tramway systems, and other technical structural work. He became vice-president and chief engineer of the Milliken Brothers Mfg. Co., when that organization succeeded to Milliken Brothers, Inc., and upon affiliation with the Blaw-Knox Co., in the fall of 1927, he continued in these capacities. He was a member of a number of engineering societies.

H. W. THOMPSON, for many years associated with Bardons & Oliver, Cleveland, manufacturers of turret lathes and other machinery, and more recently assistant to the president, in charge of sales, for the Lovell Mfg. Co., Erie, Pa., died in a New York hospital on March 31, following an operation. He was 52 years of age and received his early training in the Springfield, Ill., shops of the Missouri Pacific Railroad. He became identified with Bardons & Oliver in 1907 and was for many years in charge of that company's Detroit office. In 1925 he became identified with the Trundle Engineering Co., Cleveland, having remained with that company until 1927, when he joined the Lovell organization. He was a member of the American Society of Mechanical Engineers.

W. G. HARRIS, JR., vice-president and general manager of the Canada Metal Co., Toronto, Ont., died at his home in that city on March 28. Mr. Harris, whose father, W. G. Harris, founded the Canada Metal Co. more than 50 years ago, had been engaged in the metal industry ever since he left school.

HERMAN A. BALL, founder and president of the Ball Boiler & Tank Co., Milwaukee, died on March 28, following an operation for appendicitis, aged 52 years. He had resigned as plant foreman of the Chain-Belt Co., Milwaukee, in 1917 to establish his own plant and engage in the manufacture of a copper tube boiler of his own design.

GEORGE A. HOWE, former secretary of the Howe-Brown Co., predecessor of the present Colonial Steel Co., Pittsburgh, died in Bermuda, March 26. He was 72 years of age and a graduate of Princeton University. He practiced law in Pittsburgh for about six years before becoming secretary of the Howe-Brown Co. in 1888.

G. FRANK HATHAWAY, works manager, Worcester, Mass., works, Wyman-Gordon Co., died on March 26, aged 49 years. He entered the employ of the Wyman-Gordon Co. as a machine operator 30 years ago, and except for three years with the Park Drop Forge Co., Cleveland, he had stayed with it continuously. He was superintendent until 1925 and later works manager.

A car dumper designed to handle open-top cars with a coal capacity of 120 tons and a tare weight of 40 tons, at the rate of 20 tons an hour, is being erected at the new Delray power plant of the Detroit Edison Co., Detroit. All of the coal for this plant will be dumped by this machine. The dumper was built by the Wellman-Seaver-Morgan Co., Cleveland, being one of that company's 60-ft., heavy-duty, 4-clamp revolving dumpers. This company is now constructing a similar dumper of 52-ft. size and smaller capacity for the Duke Power Co.'s new River Bend power plant at Mount Holly, N. C.

Over 40 industries, furnishing material and equipment, will display their products at the twelfth exposition of Chemical Industries, week of May 6, when over 400 exhibits will occupy three floors of the Grand Central Palace, New York. The exposition will be divided into several sections, with one of the most important displaying all types of containers used in the field of chemistry. The most scientific methods of applying research to industry, under the supervision of competent representatives of the manufacturers of all types of equipment used in chemical and allied industries, will be exhibited.



# British Steel Mills Well Engaged

Continental Deliveries Extended—Welsh Mills Consider Price Advances—  
Scottish Pig Iron Production No Longer Profitable

(By Cable)

LONDON, ENGLAND, April 2.

**P**IG iron activity continued up to the Easter holidays and is expected to be maintained. Stocks of iron are low and Cleveland producers are increasing their output in spite of higher fuel costs. "Some furnaces are sold out for April and producers in the Cleveland association are asking a premium of 1s. 6d. (36c.) per ton for delivery beyond June.

Export demand for hematite is maintained and with domestic sales heavy, but little tonnage is available for delivery in the current month.

Finished steel is active with good shipyard demand and rail makers reported well engaged. Prices are firm and tending upward although the association quotations are unchanged.

British demand for foreign steel is dull because of the high prices and extended deliveries offered. Small lots of semi-finished material are occasionally sold when foreign steel is specified.

Welsh tin plate makers are assured of activity for a number of months as a result of recent heavy buying. Should demand continue at the present level, prices will probably advance as costs are increasing.

Galvanized sheets are quiet and mills are more inclined to accept the agreed minimum price for desirable

specifications. Japanese demand for black sheets is improving, but business is still slack.

At the annual meeting of shareholders of Merry & Cuninghame, Ltd., Glasgow, the chairman stated that production of pig iron in Scotland is no longer possible on a remunerative basis and unless some new discovery in production methods brings lower costs there is no apparent future for the industry. The actual cost at Ardeer furnaces is now £3 17s. (\$18.66) per ton.

The Friedrich Krupp A. G., Essen, Germany, will erect a steel plant and rolling mill in Manchuria for the South Manchuria Railway Co., at a total cost of 15,000,000 m. (\$3,570,000). Clyde ship launchings in March totaled 19 vessels of 75,500 tons gross register.

Richard Thomas & Co., Ltd., Swansea, has passed its dividend on preferred stock.

## European Shortage of Pig Iron and Semi-Finished Continues

(By Cable)

BERLIN, GERMANY, April 1.

**T**HE shortage of pig iron and semi-finished steel in western European countries continues and British pig iron is reported appearing in Conti-

mental markets in increasing volume.

The German domestic market is quiet, but demand for structural steel and ship plates is improving. Domestic prices of all syndicates are announced as unchanged for April. Westphalian steel producers predict a steady improvement of business in the next few months.

The export market on steel products is steady and the price tendency firmer. Business in wire rods is active and a price advance is expected.

## Steel Mill to Be Built in British Columbia

William Cooke & Co., Ltd., Vancouver, B. C., has announced plans for a steel rolling mill on Lulu Island, near Victoria, B. C. Work on the first unit will be begun soon. Scrap will be utilized as raw material. Officers of the company include H. E. Else, head of William Cooke & Co., Sheffield, England; F. B. Clegg, president, Pacific Bolt Co., Vancouver; Charles D. Hobbs, Vancouver; Frank Else, Western Hardware & Steel Co., Vancouver.

British capitalists represented in the company have already backed a number of industries in British Columbia, including the Pacific Bolt Co., Vancouver Galvanizing Co., Steel Containers, Ltd., and Western Hardware & Steel, Ltd.

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at \$4.85 per £ as follows:

Durham coke, del'd....	£0 19s.	to £0 19½s.	\$4.60	to	\$4.72
Bilbao Rubio ore*.....	1 3	to 1 3½	6.18	to	6.30
Cleveland No. 1 foundry	3 9½		16.85		
Cleveland No. 3 foundry	3 7		16.25		
Cleveland No. 4 foundry	3 6		16.00		
Cleveland No. 4 forge..	3 5½		15.88		
Cleveland basic (nom.)..	3 5		15.76		
East Coast mixed.....	3 14½		18.06		
East Coast hematite....	3 15		18.18		
Rails, 60 lb. and up....	7 15	to 8 15	37.59	to	42.43
Billets .....	6 5	to 6 7	30.31	to	30.79
Ferromanganese .....	13 15		66.69		
Ferromanganese (export)	13 10	to 14 0	65.47	to	67.90
Sheet and tin plate bars, Welsh .....	6 6¼		30.61		
Tin plate, base box....	0 18½	to 0 18¾	4.48	to	4.53
Black sheets, Japanese specifications .....	13 10		65.47		
Ship plates .....	7 12½	to 8 2½	1.66	to	1.76
Boiler plates .....	9 0	to 10 10	1.95	to	2.27
Tees .....	8 2½	to 8 12½	1.76	to	1.86
Channels .....	7 7½	to 7 17½	1.60	to	1.71
Beams .....	7 2½	to 7 12½	1.55	to	1.65
Round bars, ¾ to 3 in.	7 15	to 8 5	1.67	to	1.78
Steel hoops .....	9 0	to 10 0	1.95	to	2.16
Black sheets, 24 gage..	10 0		2.16		
Galv. sheets, 24 gage..	13 7½	to 13 10	2.90	to	2.92
Cold rolled steel strip, 20 gage (nom.).....	12 0		2.64		

\*Ex-ship. Tees, nominal.  
(a) Nominal.

## Continental Prices All F.O.B. Channel Ports (Per Metric Ton)

Foundry pig iron (a):				
Belgium .....	£3 10s.			\$16.97
France .....	3 10			16.97
Luxemburg .....	3 10			16.97
Basic pig iron (a):				
Belgium .....	3 6			16.00
France .....	3 6			16.00
Luxemburg .....	3 6			16.00
Coke .....	0 18			4.37
Billets:				
Belgium .....	5 7½			26.06
France .....	5 7½			26.06
Merchant bars:				
Belgium .....	6 3	to £6 5s.		1.34 to 1.36
France .....	6 3	to 6 5		1.34 to 1.36
Luxemburg .....	6 3	to 6 5		1.34 to 1.36
Joists (beams):				
Belgium .....	5 3	to 5 4		1.13 to 1.14
France .....	5 3	to 5 4		1.13 to 1.14
Luxemburg .....	5 3	to 5 4		1.13 to 1.14
Angles:				
Belgium .....	6 0	to 6 2		1.31 to 1.32
¾-in. plate:				
Belgium (a).....	6 11			1.43
Germany (a).....	6 11			1.43
¾-in. ship plate:				
Belgium .....	6 5½			1.37
Luxemburg .....	6 5½			1.37
Sheets, heavy:				
Belgium .....	6 1			1.31
Germany .....	6 1			1.31



# Renewal of Steel Cartel Probable

Germany Not Entirely Satisfied with New Quota But Is Likely to Continue a Member—Motor Car Builders May Combine

BERLIN, GERMANY, March 15.—Although the International Steel Cartel, at its meeting in Brussels, March 14, increased the annual quota of all members by 2,000,000 tons and granted to Germany 13,510,000 tons a year, compared with the former allotment of 12,644,000 tons, German members of the cartel are not entirely satisfied. Even the new quota is less than German production, which was 14,517,165 tons in 1928 and 16,310,682 tons in 1927. Steel producers claim that even at their present rate of operation, which is in excess of the new quota, only about 85 per cent of their capacity is engaged, while French and Belgian works are fully occupied.

German producers are also dissatisfied with the increase of 30,000 tons granted in the export allotment, raising the total to 330,000 tons a month. It is believed, however, that the new allotments for production and export point to a renewal of the agreement in the fall, as it shows a willingness on the part of the French and Belgian members to grant concessions to maintain the existence of the cartel.

While domestic steel prices are unchanged, it is considered likely that proposed advances, which were recently postponed, will be made soon. A similar situation exists in the pig iron market. Domestic prices of pig

iron were reduced twice in 1927, and at this month's meeting of the Pig Iron Syndicate a proposal was made to advance prices to the level at the beginning of 1927. It was suggested at the meeting that the increase should be about 1.50 m. (36c.) per ton.

The recent purchase of a controlling interest in the Opel Motor Co. by the General Motors Corporation has resulted in a tentative plan to combine the foremost motor car manufacturers of Germany as a means of preventing further extension of American interests in Germany. Proponents of the plan believe that the General Motors Corporation's control of the Russelheim plant of the Opel Motor Co. will lead ultimately to the production of all the General Motors cars and trucks in Germany. As German builders of motor trucks have an export surplus, they are especially interested in a combination that would prevent an invasion of the German domestic market by American trucks, even though built in Germany.

Among those interested in the proposed merger are the Buessing, Daimler-Benz, Adler, Wanderer, Horch, Brennabor, and Henschel-Maffei companies. The Nationale Automobile A. G., in which the General Electric Co. has a financial interest, is also reported as being favorable to a consolidation.

monthly allocation to each mill of a percentage quota, based on fluctuations in demand. The maximum allocation for the first month is one-twelfth of the total output in the year ended Nov. 1, 1928, less 5 per cent. The penalty for excess production and the compensation for under-production is 2s. (48c.) per base box. Most mills are well booked with business, with deliveries extending into June.

## New Polish Tube Mill Makes 100,000 Tons a Year

HAMBURG, GERMANY, March 17.—A new Mannesmann tube mill, which produces steel tubes up to 100 ft. long and 70 cm. (28 in.) in diameter, has been put into operation by the Bismarckhütte in Upper Silesia. The plant has an annual capacity of 100,000 tons and will make Poland a greater factor in export trade, as about two-thirds of the output will be offered in foreign markets. German and Polish trade agreements do not include tubes, so that Polish mills can dispose of their excess production in any foreign market. The Bismarckhütte is constructing a new blast furnace and will increase its output of steel by 400,000 tons annually.

## Japanese Steel Makers Have Profitable Year

WASHINGTON, March 26.—The iron and steel and shipbuilding companies of Japan are showing a rather marked recovery from the depression of the past five or six years, according to a report received by the Department of Commerce from Tokyo. The Toyo Mfg. Co., with a paid-in capital of 30,600,000 yen, which discontinued operations in 1926 because of financial difficulties, has recently secured an increased rental charge from the Government Steel Works, which took over the Toyo plant, the rental having been raised from 300,000 yen to 500,000 yen per year. It was pointed out that the Government Steel Works would hardly concede this unless profits were growing in some relative proportion.

The Oshima Steel Works, with a paid-up capital of only 3,600,000 yen, reported net profits of 238,000 yen in the first half of 1928 and has announced anticipated profits of about 350,000 yen for the second half. The Niigata Iron Works, manufacturing Diesel engines, oil burners, railroad equipment and iron pipe, reported

## British Steel Trade Improves

Pig Iron Demand Active—Steel Export Committee Secures Business—Tin Plate on Quota Basis

LONDON, ENGLAND, March 16.—With the severe winter weather ended, producers are resuming normal operations, and the steel market is in a strong position. There are indications that prices will continue to advance, as costs of production have increased with higher prices for fuel.

Pig iron producers, particularly on the Northeast Coast, are well engaged and expect to blow in four additional furnaces by the end of this month. Output of Cleveland pig iron is controlled, but there is no restriction in other districts. Hematite producers are shipping an increasing tonnage of iron for export, as well as to domestic consumers, and have reduced stocks on yards considerably.

Domestic business in semi-finished steel is almost entirely in the hands of British producers, only a few lots of Continental billets and sheet bars appearing on the market when low

transportation charges can be obtained. Mills are well booked with business, and Richard Thomas & Co.'s Redbourn Hill plant, which has been idle for about four years, has resumed operations.

Although plate mills have been booking some heavy tonnage, particularly from shipbuilders, more business is needed to absorb their large capacity. The recent visit to Canada of representatives of two British steel mills is understood to have resulted in some satisfactory business. The Steel Makers' Export Committee, which was appointed to supervise large export contracts, is reported to have secured some desirable business from Canada and Japan.

Tin plate producers expect satisfactory results from the quota plan recently established. More than 80 per cent of the Welsh mills are in the agreement, which provides for a

net profits of about 200,000 yen for each half year on a paid-up capital of 3,600,000 yen. The Japan Steel Tubing Co. has announced production of 110,000 tons for the five-month period, June-November, and profits which will permit the payment of a 12 per cent dividend on the preferred shares of the company. The Kobe Steel Works, formerly an interest of the Suzuki Trading Co., has announced a net profit of 357,174 yen for the six months period ended Dec. 31, 1928. A dividend of 7½ per cent has been declared and 250,000 yen has been set aside as a sinking fund for the refunding of debenture bonds.

### German Zinc Plant to Make 60,000 Tons Annually

HAMBURG, GERMANY, March 17.—A program of expansion at the Bergwerksgesellschaft von Giesches Erben, at present the largest zinc producer in Germany, will increase the capacity at its plant in Magdeburg-Elbe to about half the total for the entire country. The new plant will produce about 60,000 tons of electrolytic zinc annually from ores imported through Hamburg or up the Rhine on a canal connecting the Rhine and the Elbe, which will be completed by 1931. Plans include a power plant to generate 100,000 kw. The Harriman interests have financial holdings in the company.

The decision of the Bergwerksgesellschaft to build such a large plant commands special attention because the company is a member of the Zinc Cartel, the purpose of which is to restrict production. Construction work on the plant begins in April, and it is planned to complete it by 1931.

### Tata Works Opens Six Sales Offices on Continent

As reported in THE IRON AGE of March 28, the Tata Iron & Steel Co., India, is offering foundry pig iron in Continental markets. According to L'Usine, the European sales company is known as the Tata Foundry Iron Export Co., Ltd., and has established six offices in Europe with the intention of offering 125,000 to 175,000 tons of foundry iron annually to consumers in Germany, Italy, and other countries. Exports of Tata pig iron from India have steadily increased from 287,600 tons in 1925 to 383,960 tons in 1927 and about 428,000 tons in 1928.

### German Cartels Sell C. I. F. Foreign Port

HAMBURG, GERMANY, March 17.—Considerable difficulty in controlling export shipments has been experienced by the German cartels, which have agreements not to ship to certain producing countries. Despite efforts to prevent the shipment of hoops, wire rods, tubes and similar products to countries other than

those specified by the merchant or exporter in Germany, a considerable tonnage has been diverted. Attempts to exact a penalty of 50m. (\$11.90) per metric ton from merchants or exporters who shipped wire rods to a market other than the one for which the rods were originally purchased from the mill have not provided a solution. Last year, despite an agreement with France not to ship wire rods to German consumers, about 63,000 tons was imported from France.

Unable to control their export shipments in any other way, the cartels have adopted a policy of selling for export only on a c.i.f. basis, shipping orders through their own forwarding agents. The first association to take such action was the Wire Rod Cartel, and others are understood to be preparing to follow its example.

### Ford Buys German Plant

HAMBURG, GERMANY, March 17.—The plant of the Vereinigte Fabriken Landwirtschaftlicher Maschinen, Augsburg, has been acquired by the Ford Motor Co., which will equip the works as a second German assembly plant and will fabricate motor car bodies. The plant has been idle for some time.

### American Tin Plate Used by Chinese Cigarette Makers

WASHINGTON, March 26.—Tin plate supplied by American manufacturers to China last year was consumed largely by cigarette factories and the canning industry, according to the Iron and Steel Division, Department of Commerce. During the year American manufacturers also entered the wire nail market in competition with Belgium and Germany, and a good volume of business was obtained. American manufacturers also participated in Chinese orders for other steel products. Prospects for business during 1929 are said to be promising.

### English Steel Corporation Names Directors

LONDON, ENGLAND, March 18.—Formation of the English Steel Corporation, first announced in December, has been completed. The corporation will take over various steel interests from Vickers-Armstrongs, Vickers, and Cammell Laird & Co., and negotiations are in progress to include other important steel producers in the United Kingdom, among which are Thomas Firth & Sons, Ltd., and John Brown & Co., Ltd., both of Sheffield.

The board of directors of the new English Steel Corporation is constituted as follows: Deputy chairman, G. R. T. Taylor of Vickers-Armstrongs, Ltd.; General Sir J. F. Noel Birch; Commander C. W. Craven, special director, Vickers-Armstrongs, Ltd.; W. L. Hichens, chairman of the board, Cammell Laird & Co., Ltd., and T. L. Taylor and R. Whitehead of

Cammell Laird & Co., Ltd. G. R. T. Taylor has resigned as deputy chairman of Vickers-Armstrongs, Ltd., but continues on the board. He is succeeded by G. G. Sim. Commander C. W. Craven has been appointed managing director of the shipyard and works of Vickers-Armstrongs, Ltd., at Barrow-in-Furness and Newcastle.

### Australian Steel Output Fell Off Last Year

WASHINGTON, March 31.—Production of both pig iron and steel in Australia declined in 1928 when compared with 1927, according to a report received by the Department of Commerce from Trade Commissioner E. C. Squire, Sydney. Pig iron output dropped 88,127 tons to 410,878 tons, while the decline in steel production was 11,969 tons to 410,031 tons. The two companies representing 90 per cent of the output were the Broken Hill Proprietary Co., Ltd., and the Australian Iron & Steel Co., Ltd. Pig iron output of the former in 1928 was 304,773 tons, while that of the Australian company was 106,100 tons. The steel output of the two companies was 343,231 tons and 66,800 tons, respectively. Despite the generally reduced output, the Broken Hill company made fairly important extensions to its works during 1928 and the Australian company started work on its big plant at Port Kemble.

### Aluminum Cheaper Than Copper in Germany

HAMBURG, GERMANY, March 17.—Copper is now selling on the Continent at a higher price than aluminum. At the time of writing copper is quoted at 1920 m. per metric ton (20.73c. per lb.) in Germany, while aluminum is 1900 m. a ton (20.51c. per lb.).

Aluminum producers and manufacturers of finished aluminum products report that orders on their books have increased 19 per cent since January while the copper and brass industry reports a decrease of about 14 per cent for this period. Mills producing copper and brass tubes are particularly affected by the high copper market, consumers in most cases refusing to pay the advanced price asked for copper products, preferring to use substitutes whenever possible.

### Japan Had Record Steel Output in 1928

WASHINGTON, March 26.—Japanese iron and steel production in 1928 established a record, according to a report received by the Department of Commerce from Tokyo. Pig iron production was 1,507,764 metric tons, a gain of 253,200 tons over 1926; steel ingot output was 1,867,053 tons, a gain of 323,848 tons, and rolled steel production was 1,668,146 tons, an increase of 259,600 tons.



# Industrial Relations in Engineers' Hands

## Responsibility of Trained Executives Outlined as to Labor and Kindred Matters—Danger from Intrusion of Lawyers

ENGINEERING executives are more and more taking control of labor relations of big corporations, and bankers and boards of directors have less part in deciding labor policies, declared Sam A. Lewisohn, vice-president Miami Copper Co., New York, before the engineering students of Cornell University on March 15. Delivering the Jacob H. Schiff Memorial Foundation lecture, Mr. Lewisohn said, in part:

"The idea that labor policies of corporations are controlled by boards of directors and by New York bankers is a misapprehension. Many corporations having substantially the same banking connections have radically different labor policies. The men today who have the greatest influence on labor relations and policies are the local managers in charge of production, usually engineering executives.

"Directors are almost helpless in instituting an enlightened labor policy unless the managers in active charge understand and thoroughly believe in it. Often the directors have the greatest difficulty in persuading the managers to give up a reactionary labor policy. The training of engineers is still in most cases too narrow and does not include the study of human relations, upon which industry depends. This is of the utmost importance, because more and more the key executive positions in industry are being filled by engineers.

### Many Things Involved Besides Wages

"The popular idea that all there is to the labor problem is the worker's desire for wages is entirely wrong. Exactly the same problems exist in any organization, even where no relations between capital and labor are involved. The labor problem is not merely an economic problem—it is to a large extent an administrative problem.

"Each worker wants three things: Justice, opportunity and status. Justice includes wages and the other economic elements. These are often beyond the control of the employer, because they are in the power of great economic forces outside the factory. Justice also includes sound administration.

"It is nonsense to think that industry can be run successfully on anything approaching a parliamentary system. The functions of employee committees and works councils should be entirely advisory and consultative. They should enable the management to interpret itself to the men and the men to interpret their aspirations to the management.

"The proportion of workers who really seek advancement is much smaller than commonly believed—it

has been estimated at not more than 5 per cent. Yet the success of our industrial system is largely dependent upon the training and advancement of this more ambitious minority of workers.

"To make any progress, executives must be free from traditional class feeling and must avoid a patriarchal patronizing spirit. Above all, the trading spirit must be avoided. So also must any legalistic attitude. It is particularly dangerous for lawyers to intrude themselves into the situation."

## Studying Economic Status of the Engineer

Progress is reported in the work of the American Society of Mechanical Engineers' Committee on the economic status of the engineer. L. W. Wallace, executive secretary of the American Engineering Council, says that the council is to form a committee to act as a clearing house of information on the earnings of engineers.

The Machine Shop Practice Division of the Mechanical Engineers is analyzing some 2000 returns from the questionnaire circulated to its members. This report will be ready, it is expected, in six weeks.

## Scrap Dealers Condemn Contract Breaking

A resolution was passed by the National Association of Waste Material Dealers at its recent convention in Chicago condemning the practice of "unscrupulous dealers who under certain market conditions deliberately violate contracts." The association states that this practice takes the form of selling material already once sold if by so doing a higher price can be obtained. It is said that contract repudiation has occurred frequently of late in the scrap metal industry owing to the rapid advance in prices of new and old metal. The association resolved to assist by legal means in the prosecution of those who have broken contracts.

## Scrap Institute Forms Cincinnati Chapter

The Institute of Scrap Iron and Steel, Inc., 11 West Forty-second Street, New York, has completed organization of a chapter at Cincinnati with an election of officers. William M. Hilb, Hilb & Bauer, Cincinnati, is president; Samuel Summer Joseph Schonthal Co., Columbus, Ohio, vice-

president; R. W. Kolkmeier, Walter Wallingford & Co., Cincinnati, secretary-treasurer. Members of the executive committee are: M. D. Friedman, M. D. Friedman Co., Ashland, Ky.; Harry Silverstein, A. P. Silverstein & Son, Charleston, W. Va.; Lee Workum, Schadel-Workum Co., Portsmouth, Ohio; B. Shottenfels, David J. Joseph Co., Cincinnati.

## Industrial Uses for Air Transportation

The part which air transportation may play in facilitating hand-to-mouth buying was brought out in a talk by Maj. Talbot O. Freeman, vice-president Fairchild Aviation Corporation, New York, before a meeting of the Metropolitan section of the Taylor Society, held in New York on Feb. 28. Major Freeman enumerated some of the uses to which air transportation is already being put, particularly the carrying of repair parts for machinery which must be had in the shortest possible time, the carrying of bank clearing and other financial papers, and of course the transportation of mail. He stated that the airplane can never displace other forms of transportation in the carrying of bulk products of any kind, and for this reason will not likely become an important factor in the buying of raw materials. It was brought out that the present high cost of insurance rates on goods transported by plane is seriously hindering the development of the service, but adjustments are contemplated which will enable air express and mail to compete on more even terms with other forms of transportation.

## Welding Society to Discuss Chemical Equipment

The American Welding Society will hold its annual meeting at Engineering Societies Building, New York, April 24, 25 and 26. A feature of the last day's session will be a discussion on welding as used by the chemical and process industries, to which the following will be contributed:

"Welding Aluminum in the Chemical Industry," by W. M. Dunlap, Aluminum Co. of America.

"The Production of Ductile Welds in Nickel and Monel Metal," by N. B. Pilling, International Nickel Co.

"Welding in the Gas-Handling Industry and Requirements of Welding in the Chemical Field," by R. S. McBride, assistant editor *Chemical and Metallurgical Engineering*.

"Welding of Pressure Vessels for High Temperature and Pressures," by T. McLean Jasper, A. O. Smith Corporation.

Report of the committee studying joints in structural steel will be received, and discussed. Other matters of interest will include, educational problems, pipe welding, rail joints and welding in the aircraft industry.

# Large Exports Continue in February

## Greatest Two-Month Outgo of Finished Steel Since 1921—Imports Contained Less Finished Material

WASHINGTON, March 30.—With a total of 259,711 gross tons, exports of iron and steel from the United States in February showed a decline of 14,585 tons from the 274,296 tons shipped abroad in January, but for the 28 days the average rose to 9275 tons, against the 8848 tons for the 31 days of January. Compared with February of last year, with a total of 185,907 tons, exports registered an increase of 73,804 tons or 39.7 per cent. Relatively, this marked gain was practically maintained for the two months ended with February, for which exports aggregated 534,007 tons—36.2 per cent, or 142,420 tons, over exports of 391,587 tons for the first two months of 1928.

Imports in February, at 58,146 tons, increased 3353 tons over incoming shipments of 54,793 tons in January. Based on daily average, imports in February were at the rate of 2075 tons, compared with 1670 tons in January. Compared with imports of 48,756 tons in February, last year, those of the latest month showed a gain of 9390 tons. For the first two months imports were 112,939 tons, an increase of 5313 tons over those of 107,626 for the corresponding period of 1928.

Analyzed by classes, gains were made in exports of most products in February when compared with January, the increases being moderate but consistent. The greatest drop,

amounting to 29,201 tons, was in scrap exports, with a total of 21,552 tons in February against 50,753 tons in January. But for the two months ended with February scrap exports increased by 12,887 tons over the corresponding period of last year, while substantial gains were made in a number of other lines.

Exports of casing and oil-line pipe for the two months more than doubled, rising to 35,321 tons from 14,965 tons for the corresponding period of last year; steel bar exports more than doubled, increasing to 39,796 tons from 18,561 tons, but were lower in February than in January. Exports of structural material during the two months almost doubled last

Exports of Iron and Steel from the United States  
(In Gross Tons)

	February		Two Months Ended February	
	1929	1928	1929	1928
Pig iron .....	4,118	3,494	7,887	7,897
Ferromanganese .....	42	2,069	210	2,070
Scrap .....	21,552	29,618	72,305	59,418
<i>Pig iron, ferroalloys and scrap .....</i>	<i>25,712</i>	<i>35,181</i>	<i>80,402</i>	<i>69,385</i>
Ingots, blooms, billets, sheet bar .....	775	1,335	2,676	2,144
Skelp .....	4,249	6,533	7,068	11,398
Wire rods .....	3,539	1,345	7,950	5,315
<i>Semi-finished steel .....</i>	<i>8,563</i>	<i>9,213</i>	<i>17,694</i>	<i>18,857</i>
Steel bars .....	17,390	10,468	39,796	18,561
Alloy steel bars .....	3,102	1,017	4,887	1,538
Iron bars .....	337	175	1,648	570
Plates, iron and steel .....	18,965	11,195	36,350	21,204
Sheets, galvanized .....	17,669	11,319	34,092	22,395
Sheets, black steel .....	18,649	13,291	32,114	30,843
Sheets, black iron .....	1,175	1,069	2,178	2,105
Hoops, bands, strip steel .....	6,740	3,786	13,631	7,105
Tin plate; terne plate .....	26,687	18,129	53,074	37,797
Structural shapes, plain material .....	21,533	13,406	38,792	23,218
Structural material, fabricated .....	14,690	4,256	25,432	10,816
Steel rails .....	16,149	15,429	34,032	38,143
Rail fastenings, switches, frogs, etc. ....	2,785	3,512	5,412	12,882
Boiler tubes .....	1,818	1,611	3,342	2,758
Casing and oil-line pipe .....	18,991	5,111	35,321	14,965
Black and galvanized welded pipe .....	12,096	8,614	22,440	18,704
Malleable iron screwed pipe fittings .....	1,093	510	2,228	1,206
Plain wire .....	5,498	3,197	9,343	6,972
Barbed wire and woven wire fencing .....	5,642	4,640	12,171	9,954
Wire cloth and screening .....	201	114	353	299
Wire rope .....	724	552	1,344	1,037
Wire nails .....	1,589	1,035	3,087	2,512
Other nails and tacks .....	715	685	1,609	1,421
Horseshoes .....	26	19	47	74
Bolts, nuts, rivets and washers, except track .....	1,279	944	2,690	1,811
<i>Rolled and finished steel .....</i>	<i>215,543</i>	<i>134,084</i>	<i>415,413</i>	<i>288,890</i>
Cast iron pipe and fittings .....	2,420	2,404	4,677	5,267
Car wheels and axles .....	1,579	1,416	4,397	2,348
Iron castings .....	1,270	1,206	2,451	2,271
Steel castings .....	1,339	896	2,783	1,603
Forgings .....	1,560	473	2,802	867
<i>Castings and forgings .....</i>	<i>8,168</i>	<i>6,395</i>	<i>17,110</i>	<i>12,356</i>
All other .....	1,725	1,034	3,388	2,099
<b>Total .....</b>	<b>259,711</b>	<b>185,907</b>	<b>534,007</b>	<b>391,587</b>

Imports of Iron and Steel Into the United States  
(In Gross Tons)

	February		Two Months Ended February	
	1929	1928	1929	1928
Pig iron .....	16,299	6,387	32,407	17,514
Ferromanganese* .....	3,325	1,025	8,827	6,209
Ferrosilicon† .....	794	293	1,240	698
Ferromanganese .....	15	107	43	138
Scrap .....	8,524	2,019	15,731	6,693
<i>Pig iron, ferroalloys and scrap .....</i>	<i>28,957</i>	<i>9,831</i>	<i>58,248</i>	<i>31,252</i>
Steel ingots, blooms, billets and slabs .....	1,841	1,035	3,558	2,354
Iron blooms, slabs, etc. ....	.....	.....	.....	.....
Wire rods .....	595	2,185	1,778	3,264
<i>Semi-finished steel .....</i>	<i>2,436</i>	<i>3,220</i>	<i>5,336</i>	<i>5,618</i>
Rails and splice bars .....	743	181	814	3,331
Structural shapes .....	9,017	13,606	18,487	24,686
Boiler and other plates .....	982	14	1,055	72
Sheets and saw plates .....	923	1,490	1,750	5,782
Steel bars .....	2,751	8,816	5,885	16,692
Bar iron .....	335	284	574	433
Hoops, bands and cotton ties .....	1,536	2,686	2,718	4,604
Tubular products (wrot.) .....	4,807	2,396	7,466	4,442
Nails, tacks, staples .....	558	756	1,266	937
Tin plate .....	17	6	58	45
Bolts, nuts, rivets and washers .....	23	31	41	56
Round iron and steel wire .....	540	281	1,142	585
Barbed wire .....	349	236	634	586
Flat wire; strip steel .....	167	213	316	348
Steel telegraph and telephone wire .....	.....	.....	.....	36
Wire rope and strand .....	153	174	286	268
Other wire .....	38	53	79	94
<i>Rolled and finished steel .....</i>	<i>22,939</i>	<i>31,223</i>	<i>42,571</i>	<i>62,997</i>
Cast iron pipe .....	3,648	4,218	6,408	6,996
Castings and forgings .....	166	264	376	763
<b>Total .....</b>	<b>58,146</b>	<b>48,756</b>	<b>112,939</b>	<b>107,626</b>
Manganese ore* .....	20,820	18,215	36,416	27,591
Iron ore .....	240,934	229,578	421,242	390,756
Magnetite .....	246	.....	2,762	2,990

\*Manganese content only.

†Silicon content only.

‡Chromium content only.



year's totals, with 64,224 tons against 34,034 tons. Tin plate exports increased 15,277 tons and plates increased 15,146 tons.

#### Distribution of Exports

The largest single export item in February was tin plate, with a total of 26,687 tons, of which 7435 tons went to Japan, 3777 tons to China, 2756 tons to Argentina, 2470 tons to Canada and 1946 tons to India. Exports of plain structural material to Canada were 17,304 tons, with 1310 tons to Argentina and 815 tons to Chile. Of the 18,649 tons of black steel sheets, 8914 tons went to Canada and 1230 tons to Japan.

Canada took 14,216 tons of the plates exported and 3489 tons of the galvanized sheets; of the latter, the Philippine Islands took 2980 tons; Colombia, 960 tons; and Mexico, 934 tons. Of the steel bars, Canada took 10,063 tons; the United Kingdom, 1733 tons; and Japan, 1379 tons. Exports of steel rails included 2076 tons to Brazil, 1809 tons to Canada and 963 tons to Mexico. No rails were exported to Japan.

Exports of steel tubular goods were widely scattered. Foreign shipments of casing and oil-line pipe were distributed as follows: to the Dutch West Indies, 4997 tons; to Java and Madura, 1643 tons; to Peru, 1230 tons; to Colombia, 1036 tons; and to Argentina, 983 tons. Among countries receiving black welded pipe were Japan, taking 2521 tons; Peru, 1230 tons; Java and Madura, 823 tons; and Argentina, 816 tons. Of the 4951 tons of hoops and bands exported in February, 4336 tons went to Canada.

A total of 99,213 tons was shipped to Canada in February, while for the two months Canadian shipments were 189,502 tons, compared with 136,755 tons for the corresponding period of 1928. Exports to Japan and Chosen (Korea) in February were 22,293 tons, and for the two months were 59,808 tons, against 72,540 tons last year.

#### Sources of Imports

The largest gain in imports in February, compared with January, was

in wrought tubular products made up largely of seamless steel goods, the totals being 4807 tons and 2659 tons. For the two months the largest gain in imports was made in pig iron, with the total of 32,407 tons almost double the 17,514 tons of last year. Pig iron imports in February showed an in-

crease of 191 tons over the 16,108 tons of January. Imports of structural shapes in the two months declined one-fourth to 18,487 tons. Of the imports of structural shapes in February, 4005 tons came from Belgium, 3371 tons from Germany and 1465 tons from France.

#### UNITED STATES IMPORTS OF IRON AND STEEL PRODUCTS (In Gross Tons)

	February	January
Austria .....	4	57
Belgium .....	7,502	9,339
Czechoslovakia .....	25	645
France .....	8,866	5,793
Germany .....	7,555	5,178
Italy .....	158	153
Netherlands .....	4,520	3,311
Norway .....	1,233	2,293
Soviet Russia .....	1	0
Sweden .....	2,165	2,292
United Kingdom .....	7,787	7,471
<i>Europe</i> .....	<i>39,816</i>	<i>36,533</i>
Canada .....	10,827	10,911
Mexico .....	84	33
Barbados .....	140	0
Cuba .....	179	0
Dominican Republic ..	125	0
British India .....	6,974	7,315
Japan .....	1	0
China .....	0	1
<b>Total</b> .....	<b>58,146</b>	<b>54,793</b>

crease of 191 tons over the 16,108 tons of January. Imports of structural shapes in the two months declined one-fourth to 18,487 tons. Of the imports of structural shapes in February, 4005 tons came from Belgium, 3371 tons from Germany and 1465 tons from France.

France supplied 3351 tons and Belgium 119 tons of the 3648 tons of cast iron pipe imported. Of the 2751 tons of steel bars, 1017 tons came from Belgium, 717 tons from Sweden, 649 tons from France and 238 tons from Germany.

Soviet Russia provided 9122 tons of the 20,820 tons of manganese ore imported, while 7406 tons came from Brazil and 4124 tons from India. Ferromanganese imports, amounting to 3325 tons, came largely from Canada, 1967 tons; Norway, 719 tons; and the United Kingdom, 428 tons.

Canada led as the source of imports in February with a total of 10,827

#### By-Product Plants Coked 6,000,000 Tons

WASHINGTON, March 29.—Coal requirements of 82 by-product coke plants reporting to the Bureau of Mines totaled 6,035,134 net tons in February, against 5,418,426 tons in February of last year. The increase was 616,708 tons and, on the daily average, 15.4 per cent.

These figures are shown in the bureau's weekly coal report, dealing with consumption of coking coal by by-product coke plants which last year used a total of 69,260,000 tons of high-grade coal. The bureau has begun a new statistical service analyzing the current changes in the rate of consumption in the principal markets, including those for coking coal. Previous issues have covered the consumption of steam coal by the electric utilities and by the railroads.

The increase in requirements for coking coal in February was shared by all districts except the Mountain and Pacific area. Even in that district there was a slight increase, on the average daily basis. Of the by-product coal requirements in February, 2,384,889 tons was consumed in the Middle Atlantic district and 1,254,786 tons in the Illinois-Indiana district, these two accounting for 60 per cent of the total.

A Becker type gas plant will be built for Sheboygan, Wis. The Byllesby Engineering & Management Corporation has contracted with the Koppers Construction Co. for fifteen producer gas underfired ovens with an annual coal carbonizing capacity of 45,000 tons of coal.

#### Destination of Iron and Steel Exports from the United States

(In Gross Tons)

Countries of Destination	February, 1929	January Through February		Countries of Destination	February, 1929	January Through February	
		1929	1928			1929	1928
<i>North and Central America and the West Indies</i> .....	<i>124,051</i>	<i>244,187</i>	<i>171,772</i>	Italy .....	8,647	23,446	1,683
Canada and Newfoundland...	99,429	189,882	137,771	Netherlands .....	325	416	632
Cuba .....	5,857	12,745	10,436	Rumania .....	230	477	602
Guatemala .....	483	1,011	3,917	Soviet Russia .....	927	997	1,193
Honduras .....	1,908	2,800	643	United Kingdom .....	4,237	9,772	9,226
Panama .....	2,994	5,233	2,029	Other Europe .....	3,803	18,037	8,284
Salvador .....	334	2,023	512	<i>Far East</i> .....	<i>64,109</i>	<i>134,732</i>	<i>127,504</i>
British West Indies .....	2,242	7,498	1,019	British Malaya .....	1,646	2,730	1,070
Other West Indies .....	2,589	6,189	3,457	China .....	9,163	18,073	23,506
Other Central America .....	8,215	16,806	11,988	Dutch East Indies .....	10,153	18,302	4,063
<i>South America</i> .....	<i>47,015</i>	<i>92,275</i>	<i>64,439</i>	India and Ceylon .....	4,892	6,178	6,128
Argentina .....	13,366	25,626	15,458	Japan and Chosen .....	22,293	59,808	72,540
Brazil .....	8,027	13,454	10,790	Kwantung .....	4,494	5,062	1,526
Chile .....	3,768	9,446	12,260	Philippine Islands .....	6,357	15,469	14,616
Colombia .....	5,690	9,377	10,742	Australia .....	2,476	4,327	3,182
Peru .....	4,751	8,587	4,174	New Zealand .....	202	970	442
Uruguay .....	2,252	3,490	958	Other Asia and Far East .....	2,433	3,813	431
Venezuela .....	8,814	21,498	9,276	<i>Africa</i> .....	<i>1,755</i>	<i>3,687</i>	<i>2,615</i>
Other South America .....	347	797	781	British South Africa .....	612	746	1,541
<i>Europe</i> .....	<i>22,781</i>	<i>59,126</i>	<i>25,257</i>	Egypt .....	688	2,434	734
Belgium .....	166	226	3,083	Mozambique .....	128	150	170
France .....	4,388	5,632	482	Other Africa .....	327	357	170
Greece .....	58	123	72	<b>Total</b> .....	<b>259,711</b>	<b>534,007</b>	<b>391,587</b>

# Heavy Machinery Exports in February

Drop from January Record Was Only 7 Per Cent—Two Months One-Third Above 1928

WASHINGTON, March 30.—Despite the high total of \$46,474,717, exports of machinery of all kinds in February were \$3,540,283 below those in January, which, at \$50,015,000, made an eight-year record. For the two months exports were \$96,489,717, an increase of \$24,257,574 or 33.4 per cent over exports of \$72,232,143 for the corresponding period of last year. The increase in February, \$10,492,407, was 29.3 per cent over February of last year.

Exports of industrial machinery, as classified by the Division of Statistics, Department of Commerce, were valued at \$21,186,482 in February, against \$22,396,486 in January. For the two months they were valued at \$43,582,968, compared with \$32,247,797 in the same period of 1928.

Exports of power-driven metal-working machinery in February were valued at \$2,554,299, against \$2,089,542 in January. In February of last year they were valued at \$1,940,147.

For the first two months they were \$5,085,714, against \$4,029,689 last year. Exports of machine tools, as listed in THE IRON AGE table, in February represented 850 units, valued at \$1,376,249, against 1120, valued at \$1,382,176, in January.

Exports of agricultural implements in February were valued at \$10,530,750, against \$12,419,884 in January, and \$8,036,000 in February of last year. For the two months ended with February they were valued at \$22,951,000, against \$15,891,000 for the corresponding period of last year. Shipments of wheel tractors of 15 to 32 belt horsepower and of 33 belt horsepower and over fell off considerably in February, compared with January, according to the Agricultural Implements Division. Exports of the former class amounted to 4700, valued at \$3,849,339, compared with 6018, valued at \$5,081,077 in January; while those of the latter class numbered 594, valued at \$510,510, in February, against 926, valued at \$1,533,078, in January.

Imports of machinery and vehicles in February were valued at \$3,511,601, against \$2,891,397 in January. For the first two months the totals were \$6,402,998 in 1929 and \$4,116,887 in 1928. Items listed in THE IRON AGE table of imports were valued at \$2,833,304 in February, compared with \$2,206,164 in January. For February of last year the value was \$1,714,648. For the first two months value was \$5,022,479 in 1929, compared with \$2,918,848 in 1928.

Sharp increases were made in imports of all the listed items both for February and for the two months of the present year, when compared with the corresponding period of last year, except for a decline from last year in imports of electrical machinery and apparatus in February. The heaviest gains were in imports of "other machinery," which includes metal-working machines and other equipment.

Machinery Exports from the United States  
(By Value, in Thousands of Dollars)

	February		Two Months Ended February	
	1929	1928	1929	1928
Locomotives .....	\$230	\$80	\$557	\$206
Other steam engines.....	61	28	157	98
Boilers .....	149	73	288	148
Accessories and parts.....	160	36	222	82
Automobile engines .....	1,238	952	2,096	1,697
Other internal combustion engines .....	689	467	1,528	1,099
Accessories and parts.....	381	210	674	466
Electric locomotives .....	79	114	187	488
Excavating machinery .....	422	655	940	1,192
Concrete mixers .....	203	56	274	127
Road-making machinery .....	203	66	387	149
Elevators and elevator machinery .....	435	266	869	632
Mining and quarrying machinery .....	1,252	1,025	2,591	1,961
Oil-well machinery .....	1,779	799	3,663	1,864
Pumps .....	926	506	1,849	1,134
Sheet and plate working machines .....	269	96	505	222
*Machine tools .....	1,488	1,315	2,953	2,714
Forging machinery .....	99	57	163	146
Other metal-working machinery and parts.....	586	433	1,172	881
Textile machinery .....	1,095	922	2,214	2,138
Sewing machines .....	943	718	1,821	1,386
Shoe machinery .....	187	133	392	302
Flour-mill and gristmill machinery .....	73	54	150	90
Sugar-mill machinery .....	135	1,112	279	1,295
Paper and pulp-mill machinery .....	176	393	461	688
Sawmill machinery .....	72	70	142	137
Other woodworking machinery .....	141	106	329	317
Refrigerating and ice-making machinery .....	737	581	1,647	1,164
Air compressors .....	637	506	1,285	861
Typewriters .....	1,940	1,777	3,950	3,733
Power laundry machinery..	109	73	329	132
Typesetting machines .....	617	308	1,229	770
Printing presses .....	665	462	1,227	859
Agricultural machinery and implements .....	10,531	8,036	22,951	15,891
All other machinery and parts .....	17,768	13,497	37,009	27,163
Total .....	\$46,475	\$35,982	\$96,490	\$72,232

\*Principal details are shown in another table.

Exports of Power-Driven Metal-Working Machinery

	February, 1929		January, 1929	
	No.	Value	No.	Value
Engine lathes .....	72	\$116,078	72	\$181,801
Turret lathes .....	38	100,911	46	91,546
Other lathes .....	70	118,353	63	78,026
Vertical boring mills and chucking machines .....	55	74,733	36	29,916
Thread-cutting and automatic screw machines..	63	82,929	107	135,100
Knee and column type milling machines .....	33	77,090	41	130,459
Other milling machines...	65	121,162	65	110,947
Gear-cutting machines .....	44	107,617	33	84,236
Vertical drilling machines	39	28,864	36	28,529
Radial drilling machines..	8	21,969	10	19,381
Other drilling machines...	82	38,696	287	36,359
Planers and shapers .....	49	100,205	51	102,667
External cylindrical grinding machines .....	77	213,898	143	154,946
Internal grinding machines	40	131,989	45	144,248
Metal-working tool-sharpening machines .....	115	41,755	85	54,011
Total .....	850	\$1,376,249	1,120	\$1,382,176

Imports of Machinery Into the United States

	(By Value)		Two Months Ended February	
	February		1929	
	1929	1928	1929	1928
Metal-working machine tools .....	\$105,313	\$31,539	\$185,121	\$88,167
Agricultural machinery and implements .....	953,127	544,200	1,366,794	946,715
Electrical machinery and apparatus .....	163,555	187,687	339,845	284,742
Other power-generating machinery .....	33,178	14,218	98,138	21,415
Other machinery .....	1,274,470	665,757	2,272,432	1,136,166
Automobiles and other vehicles, except agricultural .....	303,661	271,247	760,149	441,643
Total .....	\$2,833,304	\$1,714,648	\$5,022,479	\$2,918,848



# Machinery Markets and News of the Works

## March a Good Month

Machine Tool Sales Equal to or in Excess of Total  
for February—Inquiries Still Numerous

THE machine tool industry has concluded one of the most active quarters in its history. The volume of orders in March for nearly all tool builders was at least equal to, and in many instances in excess of, the total for either January or February. Some manufacturers in the Cincinnati district report that their orders last month were slightly less than in February, but this was not a general condition.

The volume of business for individual companies has been controlled somewhat by the ability to make deliveries that are satisfactory to buyers.

The automobile industry again contributed substantially to bookings of the past week. An automobile manufacturer purchased special tools

valued at about \$250,000 for work on a new model, and another has placed large orders.

Railroad buying looks more promising, with lists of small to medium-sized lots pending from the Santa Fe, Norfolk & Western, Chesapeake & Ohio, Northern Pacific, Big Four and Wabash. The St. Paul road placed orders in Chicago for a few machines.

Foreign sales have increased during the past month. Numerous scattered orders, principally from South American countries, have been received. The Amtorg Trading Corporation, New York, continues to buy tools for shipment to Russia.

The Morgan Engineering Co., which is enlarging its plant facilities at Alliance, Ohio, has bought a number of tools.

## New York

NEW YORK, April 2.—Nearly all local machine tool sales offices closed their books at the end of March with a gain over the totals for February. Orders have been placed during the past week against the recent inquiry of the Inter-type Corporation, Brooklyn. Inquiries continue in fairly good volume, and dealers and direct representatives see no indication of a falling off in orders this month.

A fund of \$8,000,000 has been authorized by New York Power & Light Corporation, Albany, N. Y., subsidiary of Mohawk-Hudson Power Corporation, same address, for extensions in power plants and systems, including installation of generating equipment. Bids will be asked in about 60 days for hydroelectric generating plant at Conklinville dam, Conklinville, N. Y., to cost about \$750,000 with equipment.

Board of Water Supply, Gas & Electricity, Municipal Building, New York, will soon begin construction of one-story equipment repair and reconditioning shop, to cost over \$60,000 with machinery.

Rainbow Luminous Products, Inc., operating Rainbow Light, Inc., 21-43 Forty-fourth Road, Long Island City, manufacturer of tube lighting equipment, is arranging a capital stock fund of

\$3,500,000, more than three-fourths of which will be used for expansion.

New York Air Terminals, Inc., care of Richard F. Hoyt, of Hayden, Stone & Co., 25 Broad Street, New York, investment securities, chairman, has awarded general contract to W. F. Carey & Co., 44 Wall Street, for airport on Hackensack meadows, Secaucus, N. J., consisting of hangars, machine and repair shops, field equipment and other buildings, to cost about \$3,000,000 with equipment.

F. A. D. Andrea, Inc., 24 Orchard Street, Hunters Point, Long Island City, manufacturer of radio equipment and parts, has recently taken over adjoining property, practically doubling former capacity.

American Can Co., 120 Broadway, New York, has authorized construction of one-story plant at North Chicago, Ill., totaling about 85,000 sq. ft. space, to cost about \$500,000 with equipment. Unit will be used primarily for construction and repair of machinery for capping tin cans, and factory in leased quarters at Waukegan, Ill., for this branch of output will be removed to new location.

J. D. Johnson Co., Park Avenue and 176th Street, New York, plumbing equipment and supplies, has asked bids on general contract for a three-story plant, 50 x 115 ft., at Brooklyn, to cost more than \$75,000 with equipment. Part of structure will be used for storage and

distribution. William Higginson, 101 Park Avenue, New York, is architect.

Aviation Corporation, New York, care of W. A. Harriman, W. A. Harriman & Co., 39 Broadway, investment securities, chairman, recently organized with capital of 10,000,000 shares stock, no par value, is concluding negotiations for purchase of Fairchild Aviation Corporation, 270 West Thirty-eighth Street, New York, capitalized at \$5,000,000, operating Fairchild Airplane Mfg. Corporation, with plant at Farmingdale, L. I.; Fairchild Aerial Camera Corporation, Fairchild Aerial Surveys and Fairchild Flying Corporation. New owner plans expansion for monoplane production, and has disposed of stock issue totaling \$40,000,000, part of proceeds to be used for acquisition and development, including purchase of controlling interest in other aircraft organizations. Graham B. Grosvenor is president.

Anchor Cap Corporation, 22 Queens Street, Long Island City, operating Anchor Cap & Closure Co. and American Metal Cap Co., 2 Summit Street, Brooklyn, is arranging to consolidate all production at Long Island City plant. Work will soon begin on new unit to cost more than \$200,000.

Metal Textile Corporation, recently organized with capital of 245,000 shares of stock to take over company of same name with plant at 4 Central Avenue, West Orange, N. J., manufacturer of kitchen utensil metallic cleaning devices, is disposing of stock issue to total \$980,000, part of proceeds to be used for expansion.

Wright Aeronautical Corporation, Lewis Street, Paterson, N. J., manufacturer of aircraft engines, has awarded contract to J. W. Ferguson Co., 152 Market Street, for additional one-story unit, to cost about \$80,000 with equipment.

Middlesex County Vocational School Board, Easton Avenue, New Brunswick, N. J., will receive bids until April 11, for three-story addition to vocational school, to cost about \$260,000 with equipment. Alexander Merchant, 52 Paterson Street, is architect; Saul Shaw & Co., 24 Commerce Street, are engineers.

Campbell Mfg. Co., Freehold, N. J., manufacturer of flashlights and accessories, contemplates enlargement of plant for manufacture of other specialties and installation of additional equipment. J. W. Olsen is production manager.

Arcturus Radio Co., 253 Sherman Avenue, Newark, manufacturer of radio tubes and kindred specialties, has purchased factory at 708-20 Frelinghuysen Avenue, totaling 110,000 sq. ft. floor space, for expansion. It will be equipped for output of about 28,000 tube units per day.

Shell Western Petroleum Products Co., an interest of Shell Union Oil Co., 65 Broadway, New York, is said to have plans for oil storage and distributing plant at Sewaren, N. J., to cost more than \$100,000 with equipment.

W. T. Crane Carriage Hardware Co., 165 Mulberry Street, Newark, will dis-

continue operations on June 1, after 54 years of existence.

Dayton-Dunbar, Inc., 149 Broadway, New York, has been appointed by Oil-gear Co., Milwaukee, as selling agent for its hydraulic units, presses and broaching machines in New York territory, including Massachusetts and Connecticut west of Connecticut River and northern New Jersey.

Skenandoa Rayon Corporation, Utica, N. Y., has engaged W. E. S. Dyer, Land Title Building, Philadelphia, engineer, to prepare plans for power house for new rayon mill units, entire project to cost about \$3,000,000.

## Philadelphia

**P**HILADELPHIA, April 1.—Contract has been let by Rundle Mfg. Co., Cleveland Street, Milwaukee, manufacturer of plumbing equipment and supplies, to Barclay White & Co., 22 North Thirty-sixth Street, Philadelphia, for branch plant at Camden, N. J., consisting of one-story foundry, 150 x 325 ft.; one-story enameling shop, 20 x 80 ft.; three-story mill unit, 68 x 70 ft.; two-story storage and distributing building, 120 x 180 ft.; and power plant, 60 x 88 ft., to cost about \$1,000,000 with equipment. R. A. Wickland & Co., Inc., 205 West Wacker Drive, Chicago, is engineer.

Publicker Commercial Alcohol Co., Bigler Street and Delaware Avenue, Philadelphia, has awarded general contract to S. H. Levin, 1619 Sansom Street, for additions, including power plant, to cost about \$225,000 with equipment.

In connection with expansion program at plant at Marshall and Noble Streets, Philadelphia, General Electric Co., Witherspoon Building, Philadelphia, is arranging for removal of main plant at Baltimore to this location, where district operations will be concentrated. Brass foundry will be continued at 1900 Washington Boulevard, Baltimore, as heretofore. Close to \$300,000 will be expended in extensions to Philadelphia plant. Harris & Richards, Drexel Building, are architects.

Certified Brake Service Co., 1432 Hunting Park Avenue, Philadelphia, has leased property at 1415 Chestnut Street for branch service and repair shop for automobile brakes.

Ovens, power equipment, conveying and other machinery will be installed by Cushman's Sons, Inc., 1819 Broadway, New York, in new plant at Philadelphia, to cost about \$250,000.

Frank Plotnick Co., Coral and Letterley Streets, Philadelphia, manufacturer of toys, has leased space in building at 1926 North Front Street for expansion.

Pedrick Tool & Machine Co., Philadelphia, has been organized with capital of \$60,000 to take over and expand company of same name, with plant at 3640 North Lawrence Street. Albert D. and Howard A. Pedrick head new company.

Board of Education, Bridgeton, N. J., is said to be planning installation of manual training equipment in two-story high school to cost about \$350,000, for which plans will be drawn by Edwards & Green, 548 Federal Street, Camden, N. J., architects.

City Council, Allentown, Pa., has authorized purchase of 315-acre tract near Shoenersville, Pa., for municipal airport, to cost about \$230,000 with equipment.

Superior Equipment Co., Wilmington, Del., N. L. Shaten, president, has taken

over local building and will soon begin operations to manufacture automobile heaters, door devices and kindred hardware products.

Keystone Aircraft Corporation, Bristol, Pa., has plans for one-story addition, 100 x 250 ft., to cost more than \$225,000 with equipment. Company recently increased capital from 300,000 to 500,000 shares of stock for expansion.

## Buffalo

**B**UFFALO, April 1.—Bids will soon be asked on general contract by Arrow Head Steel Products Co., 89 Oak Street, Buffalo, manufacturer of engine parts, pistons, etc., for one-story unit, to cost about \$100,000 with equipment. Headquarters are at Minneapolis, Minn.

Decorated Specialty Paper Mfg. Co., Hoosick Falls, N. Y., operating at former local Walloomsac mill of Steven & Thompson Paper Co., plans removal to Filer City, Mich., where production will be concentrated and capacity increased. Company will operate in close cooperation with Filer Fiber Corporation, Filer City.

New interests identified with Sage, Wolcott & Steele, 183 East Main Street, Rochester, N. Y., investment securities, have acquired control of Garlock Packing Co., Palmyra, N. Y., manufacturer of mechanical packing, and will direct operations. Expansion is planned.

Crew-Levick Co., 219 North Broad Street, Philadelphia, refined oils, gasoline, etc., has plans for one-story storage and distributing plant at Syracuse, N. Y., to cost about \$60,000 with equipment.

National Flying Schools, Inc., Buffalo, recently organized with paid-in capital of \$1,250,000 by Reuben H. Fleet, president and general manager of Consolidated Aircraft Corporation, 2050 Elmwood Avenue, and associates, is completing plans for construction and operation of aviation schools in different parts of country, to include hangars, machine repair and reconditioning shops, oil storage and other buildings, each to cost more than \$250,000 with equipment. Mr. Fleet is president of organization.

Co-Operative Grain League Federation Exchange, Chamber of Commerce Building, Buffalo, has plans for six-story grain mill, to include conveying, elevating, screening and other equipment, to cost about \$325,000. Baxter Engineering Co., Ellicott Square, is engineer.

Danly Machine Specialties, Inc., Chicago, maker of standardized die sets, has opened warehouse and assembly plant at 16 Commercial Street, Rochester, N. Y., in charge of A. F. Wallace. Complete stock of die sets and die makers' supplies is carried.

## Detroit

**D**ETROIT, April 1.—Contract has been let by Johnston & Jennings Co., North Solvay Avenue, Detroit, manufacturer of rolling mill machinery, forgings, etc., to Bennage & McKinstrie Co., 4612 Woodward Avenue, for one-story addition to cost about \$65,000 with equipment. A. G. Simon, 112 Prospect Avenue, Cleveland, is architect. Company headquarters are on Fort Addison Road, Cleveland.

Automotive Fan & Bearing Co., Jackson, Mich., has acquired plant and business of Johnson & Walters Mfg. Co., 10628 Cloverdale Avenue, Detroit, manufacturer of metal stampings, automobile

specialties, etc., and will consolidate. Detroit plant will be continued for present, with Charles W. Walters, formerly president of purchased company, in charge. Later, expansion will be carried out at Jackson works, and Detroit business removed there.

Bohn Aluminum & Brass Corporation, 2512 East Grand Boulevard, Detroit, is erecting addition for centralization of aluminum extrusion operations, totaling about 50,000 sq. ft. floor space, to cost \$250,000 with machinery.

Detroit Lead Pipe Works, Inc., 600 West Larned Street, Detroit, has awarded general contract to Austin Co. for one-story addition, to cost about \$100,000 with equipment. Part of structure will be used for storage and distribution.

Olds Motor Works, Inc., Lansing, Mich., has awarded general contract to Reniger Construction Co., Lansing, for two-story addition, 160 x 795 ft., to be used in part for storage and distribution, to cost about \$350,000 with equipment.

Preas Metals of America, Inc., Marysville, Mich., has asked bids on revised plans for two-story addition, to cost about \$40,000 with equipment. George L. Harvey, Federal State Bank Building, Port Huron, Mich., is architect.

Kermath Mfg. Co., 5890 Commonwealth Avenue, Detroit, manufacturer of marine engines, parts, etc., is arranging for sale of 43,000 shares of stocks, no par value, part of proceeds to be used for expansion.

Gavin Ritchie & Sons, Battle Creek, Mich., have been incorporated under same name to manufacture electric air pressure regulating devices. Distribution of products will be handled by Air Regulating Sales Co., 2111 Woodward Avenue, Detroit. H. T. Ritchie is president. Company will be in market from time to time for additional equipment.

## South Atlantic

**B**ALTIMORE, April 1.—Bids will be asked on general contract about April 15 by Procter & Gamble Co., Cincinnati, for soap manufacturing plant at Baltimore, to cost about \$4,000,000 with equipment. Henry Manley, 5 East Fifty-third Street, New York, is architect.

Alemite Lubricator Co., 137 West North Avenue, Baltimore, has awarded general contract to E. Eyring & Sons Co., 808 South Third Street, for two-story plant, 55 x 106 ft., to cost \$24,000 with equipment. R. C. Brockmeyer, 1665 Milton Avenue, is architect.

Crown Cork & Seal Co., Inc., 1511 Guilford Avenue, Baltimore, manufacturer of metal bottle caps and capping machinery, is said to be arranging for expansion to cost more than \$1,000,000, including installation of machinery in buildings now under construction, and additional units. Charles E. McManus is president.

Cartersville Foundry & Machine Co., Cartersville, Ga., has authorized plans for two one-story units to be equipped as a foundry and machine shop respectively, largely for production of cast iron pipe, to cost about \$45,000. John W. Jackson is general manager.

Board of District Commissioners, District Building, Washington, has authorized appropriation of \$205,000 for building and equipping mechanical repair shops and laboratory at Bryant Street pumping station. A. L. Harris, address noted, is architect.

Eastern Silica & Chemical Co., Winchester, Va., is arranging list of equip-



ment for installation in new pulverizing plant at Gore, Va., including grinding machinery, crushers, mechanical washers, Diesel engine and generator and auxiliaries. John F. Penrose is president.

Georgia Power Co., Atlanta, Ga., has plans for steam-operated electric generating plant on Chattahoochee River, near Atlanta. Project will include transmission line and will cost over \$5,000,000.

Williams Flying Service, Inc., Greenville, S. C., has approved plans for hangar, 100 x 120 ft., at Municipal airport, with repair and reconditioning facilities, to cost more than \$40,000.

Standard Oil Co., Columbia, S. C., has authorized construction of new storage and distributing plant at Williams and Senate Streets, to cost about \$185,000 with equipment.

Board of District Commissioners, District Building, Washington, is said to be planning installation of manual training equipment in three-story junior high school at Seventeenth Place and C Street, N.E., to cost about \$450,000. A. L. Harris, address noted, is architect in charge.

J. C. Welch Motor Co., High Point, N. C., will soon take bids for two-story and basement service, repair and garage building, 190 x 200 ft., to cost \$100,000 with equipment. Herbert Hunter, High Point, is architect.

Pangborn Corporation, Hagerstown, Md., maker of sand-blast and dust collecting equipment, has taken over goodwill, patterns, records and drawings of Universal Shot & Sand-Blast Mfg. Co., Hoboken, N. J., and will make all equipment, parts and supplies manufactured by latter company. Robert E. Donnelly and Frank C. Weber, former owners of Universal company, are now associated with Pangborn Corporation.

## New England

**B**OSTON, April 1.—Despite inability of the trade to guarantee deliveries within a month or more, machine tool dealers in March did a good business. April opens with a perceptible lull in inquiries for new tools, and sales the past week, compared with other weeks in March, were comparatively small. Some shops are placing orders at extended delivery dates with the understanding that cancellations may be exercised, if necessary.

Sales of used tools the past week were at a minimum because of the few desirable tools and the high prices asked. One shaper, in good condition, sold for \$1,600, and small punch presses are bringing war-time prices.

Parker Brothers Iron Co., 123 Terrace Street, Boston, will build an addition to cost \$10,000.

King Union Co. (Hillsgrove), Warwick, R. I., manufacturer of pipe fittings, is building a one-story addition, 33 x 75 ft.

Kinne & Palmer, 256 Main Street, Derby, Conn., architects, closed bids April 1 for a one-story addition, 56 x 100 ft., for Hershey Metal Products Co., that city.

Ashton, Huntress & Alter, 477 Essex Street, Lawrence, Mass., will close bids April 5 on a four-story printing plant, 51 x 91 ft., for Lawrence *Eagle Tribune*. Motors and conveying equipment are under consideration.

Bethlehem Shipbuilding Corporation, East Howard Street, Quincy, Mass., has plans for two-story shop addition to Fore

## The Crane Market

**I**NQUIRY for electric overhead cranes is active and some business is being placed. The largest award of cranes in the past week was the list of 21 cranes placed by the Chesapeake & Ohio Railway Co. Some substantial business is pending, including a list of seven small capacity overhead cranes and an inquiry from the Southern Railway Co., Washington, for four 15 or 20 ton, gasoline or steam operated locomotive cranes for prompt shipment from builder's stock. Only a few crane orders have been placed lately in the Pittsburgh district, but the pending list still is imposing, particularly for steel mill cranes. Few of the several crane builders lack orders; most of them have taken more orders so far this year than in any similar period for a long time and some are booked fully to the middle of the year. Illinois Steel Co., Gary, Ind., will buy 14 overhead cranes ranging in capacity from 5 tons to 40 tons each. Inland Steel Co., Chicago, will buy four overhead electric cranes and a ladle crane. Milwaukee Central Board of Purchases, City Hall, will soon ask bids for one 25 to 30-ton locomotive crane for new municipal ferry terminal under construction on Jones Island. J. W. Nicholson is chief buyer.

Among recent purchases are:

Chesapeake & Ohio Railway Co., Richmond, Va., 19 15-ton, one 250-ton and one 10-ton overhead cranes for new shops in Kentucky, from Whiting Corporation.

Gulf Refining Co., Houston, Tex., 40-ton locomotive crane from Ohio Locomotive Crane Co.

Pittsburgh & Lake Erie Railroad, 15-ton, 80-ft. span gantry crane from Shaw Electric Crane Co.

City of Geneva, N. Y., 6-ton, crawler tread shovel crane from Orton Crane & Shovel Co.

Department of Public Works, Victoria, B. C., two 6-ton crawler tread shovels, from Orton Crane & Shovel Co.

Menuet & Koenig, Holmesville, Ohio, 6-ton crawler tread shovel from Orton Crane & Shovel Co.

Erie Stone Co., Kokomo, Ind., 12-ton, crawler tread shovel from Orton Crane & Shovel Co.

Interstate Iron & Steel Co., Chicago, 6 mill-type overhead cranes from Morgan Engineering Co.

Byllesby Management & Engineering Corporation, one 10-ton and one 5-ton cranes from Cleveland Crane & Engineering Co.

River shipyard, to cost about \$45,000 with equipment.

Cheney Co., Melrose, Mass., manufacturer of wall flashing and kindred metal products, has acquired two-story factory at Winchester, Mass., for new plant.

American Electro-Metal Corporation, care of Lockwood Greene Engineers, Inc., 24 Federal Street, Boston, architect and engineer, affiliated with a company in Germany, has awarded general contract to J. A. Greenleaf & Sons Co., 20 Washington Street, Auburn, Me., for one-story plant, 110 x 135 ft., at Lewiston, Me., to manufacture electrical appliances, parts, etc., to cost about \$90,000 with equipment.

New England Mfg. Co., Augusta, Me., manufacturer of automobile headlights, has leased factory at Bridgeport, Conn.,

and will remove to that location, with installation of additional equipment for enlarged output.

Scott & Williams, Inc., Union Avenue, Laconia, N. H., manufacturer of knitting machines and parts, has plans for four-story addition, 60 x 180 ft., to cost about \$130,000 with equipment.

United States Fastener Co., South Boston, Mass., manufacturer of metal snap fasteners, etc., has arranged for merger with Waterbury Fastener Co., Waterbury, Conn., manufacturer of kindred specialties. It is proposed to maintain both plants and expansion is planned.

United Illuminating Co., New Haven, Conn., has awarded general building contract to Dwight Building Co., 69 Church Street, for four-story addition to steam-operated electric generating plant at Steel Point, 150 x 165 ft., to cost about \$900,000 with equipment.

Andren-Myerson Co., 411 Atlantic Avenue, Boston, has been formed by a consolidation of Joseph Myerson, above address, and Karl Andren Co., 250 Congress Street. Company will continue to deal in power equipment. H. P. Caddy is president, and Joseph Myerson, treasurer.

## Cleveland

**C**LEVELAND, April 1.—Machine tool business continued in good volume the past week. March sales were considerably larger than those in January and February. Business last month by some local manufacturers and dealers was about equal in volume to any of their best previous months. Sales are well scattered among various industries with most orders for single machines or for small lots. Considerable business is coming indirectly from the automotive industry, although motor car manufacturers are not buying much equipment at present.

Used machinery is in good demand and good used tools are not plentiful. Deliveries of new machinery in some cases have been extended as far as September, but some manufacturers have increased production to such an extent that their shipments about equal new orders.

Morgan Engineering Co., Alliance, Ohio, is enlarging its plant facilities and the past week purchased three lathes, two shaping machines, a 36-in. side head boring mill, large milling machine and a large No. 7 gear cutter. Goodyear Tire & Rubber Co. and B. F. Goodrich Co., Akron, bought a few tools and an Akron manufacturer of tire molds purchased two boring mills. Hupp Motor Car Corporation, Detroit, bought a few machines for its Cleveland plant.

Plant of McMyler Interstate Co., Bedford, Ohio, was sold March 29 by the receiver to bondholders who bid \$600,000 for land, buildings and equipment. No plans have as yet been announced regarding future of plant.

American Shipbuilding Co., Cleveland, has established an industrial division which will use production facilities of its Cleveland and Lorain plants for work outside of shipbuilding line. This department will make heavy forgings and gray iron castings and will engage in heavy plate and other structural work.

Macomber Steel Co., Canton, Ohio, is erecting an addition, 76 x 188 ft., to its airplane hangar department.

Union Cap Screw Co., Union Avenue, Cleveland, will enlarge its plant by an addition providing 12,000 sq. ft. of floor space.

Plans are being drawn by American Fork & Hoe Co., B. F. Keith Building, Cleveland, for two-story addition to factory at Geneva, Ohio, 45 x 200 ft., to cost about \$75,000 with equipment. C. B. Rowley, address noted, is architect.

Glidden Co., Madison Avenue, N. W., Cleveland, has acquired plant and business of Metals Refining Co., Hammond, Ind., and will operate as a subsidiary. An expansion program has been authorized, to include extensions in Hammond plant and installation of additional machinery.

Guide Motor Lamp Mfg. Co., 2130 West 110th Street, Cleveland, manufacturer of automobile headlights, etc., will increase capacity about 50 per cent at a cost of \$225,000, including equipment. Company is a division of General Motors Corporation, Detroit.

Wheeler Metal Products Corporation, recently organized to take over and expand Wheeler Radiator & Mfg. Co., 1637 Collamer Avenue, East Cleveland, Ohio, has arranged for sale of stock in amount of \$310,000, part of proceeds to be used for general expansion.

Board of Education, 421 Rockwell Avenue, Cleveland, is asking bids until April 8, for equipment for vocational training schools, including two 10-in. drill presses, power band saws, wheel grinders, wood-turning lathes and other tools.

Sun Oil Co., Finance Building, Philadelphia, has acquired about 50 acres adjoining refinery at Toledo, Ohio, and plans expansion. Immediate work will include extensions in storage and distributing division to cost more than \$85,000.

## Milwaukee

**M**ILWAUKEE, April 1.—For many local machine-tool shops, March was the best month since the present heavy buying movement set in. Inquiry also has been active, and prospects for April are considered excellent. Little progress has been made in balancing deliveries with specifications because of the continued flow of orders. Some users have placed orders for late summer and early fall requirements to guard against delays. Demand runs largely to single items and is widely diversified.

Hamilton Mfg. Co., Two Rivers, Wis., manufacturer of steel and wood equipment for printing plants, dental and optical office fixtures, etc., has placed contract with Immel Construction Co., Fond du Lac, Wis., for three-story extension, 60 x 150 ft. W. Fred Dolke, 9 South Clinton Street, Chicago, is architect.

Milwaukee Forge & Machine Co., 340 Oklahoma Avenue, Milwaukee, has started work on an addition, 75 x 180 ft., and is making alterations in existing buildings to increase capacity. R. W. Roberts is president.

Nash Motors Co., Kenosha, Wis., is erecting a \$150,000 addition, 100 x 250 ft., to foundry of branch works at Racine, Wis., and is inquiring for two cranes and other equipment. D. M. Averill is general manager Racine division.

Modine Mfg. Co., Racine, Wis., manufacturer of radiators for gasoline and oil engines, copper radiation for space heat-

ing, and similar specialties, is increasing its floor space by acquisition of another three-story unit of former American Seating Co. plant at Racine, part of which it now occupies. Purchases of equipment are under way. A. B. Modine is president and general manager.

Gay Brothers, Gay Building, Madison, Wis., have plans by Balch & Lippert, local architects, for a three and four-story garage, 50 x 170 ft., costing \$100,000. Contracts will be placed about May 1.

Rector Gasifier Corporation, Waukesha, Wis., with an authorized capital stock of \$300,000, has been organized by Waukesha capital to manufacture a device designed by Enoch Rector, to use crude oil as fuel in internal combustion engines. Principals include S. A. Perkins, president of Waukesha Motor Co.; E. R. Estberg, president Waukesha National Bank, and H. J. Frame, vice-president of bank. Mr. Rector is an engineer of Waukesha Motor Co. staff. Production for the present will be confined to devices for heavy-duty gasoline engines used in operation of cranes, shovels, tractors, etc.

## Chicago

**C**HICAGO, April 1.—Volume of March sales by individual dealers appears to have been controlled somewhat by ability to make deliveries. Some sellers found new business a record in the month just closed while others report that January and February were better from the viewpoint of orders. It is evident that buyers are giving closer attention to dates of shipment and are growing less patient when promises are not kept.

The St. Paul railroad is placing orders against a small list and the International Harvester Co., Fort Wayne, Ind., is buying on quotations that have been in for some time. Nash Motors Co., Kenosha, Wis., has ordered a way driller and Case Threshing Machine Co., Racine, Wis., is purchasing special equipment. Chicago Board of Education will buy a drill press, 16-in. band saw, 11-in. x 4-ft. engine lathe and a 6-in. bench jointer. Kropp Forge Co., Chicago, is in need of shop tools and electric heat-treating furnaces.

Caterpillar Tractor Co., Peoria, Ill., will soon begin work on additions for which general contract has been let to Fred Harbers & Sons, Peoria, consisting of main production and assembling unit, 475 x 1200 ft., with gray iron foundry adjoining, to cost more than \$1,500,000 with equipment.

Acme Aluminum Foundry Co., 814 West Seventy-fifth Street, Chicago, is considering two-story and basement addition, 50 x 125 ft., to cost about \$45,000 with equipment.

Merit Co., 2125 Rice Street, Chicago, manufacturer of metal caskets, hardware, etc., has purchased property, 115 x 315 ft., for new plant, and plans erection of three-story unit containing about 100,000 sq. ft. floor space, to cost more than \$300,000 with equipment.

Ritefit Mfg. Co., 11 Second Street, S. E., Minneapolis, Minn., manufacturer of pistons and kindred products, has awarded general contract to Arnold Construction Co., Guardian Life Building, St. Paul, for one-story addition, 42 x 175 ft., to cost about \$45,000 with equipment.

Chicago Transformer Corporation, 4541 Ravenswood Avenue, Chicago, has leased

part of building at Washington Boulevard and Talman Avenue for expansion.

Lindberg Steel Treating Co., 221 Union Park Court, Chicago, has plans for one and two-story addition, to cost about \$45,000 with equipment. Clarence E. Frazier, 64 West Randolph Street, is architect.

Pioneer Gravel Equipment Co., 2505 University Avenue, S. E., Minneapolis, has superstructure under way for one-story plant, 180 x 200 ft., to cost about \$65,000 with equipment. A traveling crane will be installed. Sund & Dunham, Essex Building, are architects.

R. O. Parry and L. L. Jones, C. A. Johnson Building, Denver, associated architects, have plans for three-story and basement automobile service, repair and garage building, 125 x 125 ft., to cost more than \$100,000 with equipment.

American Electric Fusion Co., 2610 Diversey Avenue, Chicago, has awarded general contract to J. A. Moraw & Owens, 144 West Forty-seventh Street, for two-story addition to welding works, 44 x 130 ft., to cost about \$30,000 with equipment. W. Harley, 64 West Randolph Street, is architect.

McQuay Radiator Co., 1600 Broadway, N. E., Minneapolis, is having plans drawn for a two-story addition, to cost more than \$40,000 with equipment. Perry E. Crosier, New York Life Building, is architect.

Universal Stamping & Mfg. Co., 2839 North Webster Avenue, Chicago, will build a two-story addition, 107 x 174 ft., to cost \$50,000. J. M. Brandstedter, 2001 West Pershing Road, is architect.

Hardware Specialties Co., 1215 North Maplewood Avenue, Chicago, will build a factory, 75 x 125 ft., to cost \$14,000.

Harry G. Masten Co., 105 West Monroe Street, Chicago, has been appointed distributor in this district for Una Welding & Bonding Co., Cleveland, manufacturer of welding machines and welding wire.

American Spiral Pipe Works, Fourteenth Street and Forty-eighth Avenue, Chicago, maker of spiral riveted steel pipe, forge welded steel pipe, forged steel pipe flanges and forged tubular products, has changed name to Taylor Forge & Pipe Works.

Ottumwa Special Body Works, Ottumwa, Iowa, has been established at 314-318 Church Street by M. L. Van Fossan, formerly of Battle Creek Special Body Works. A floor has been equipped to build special automobile bodies and do general body repair work.

## Cincinnati

**C**INCINNATI, April 1.—While machine tool sales in March were large, they failed to reach the peak attained in February. Some companies showed a gain over the previous month, but total bookings in the local market tapered off somewhat from the February level. Although inquiries are in large volume, many builders are of the opinion that there will be at least a mild recession in business during the spring and summer with a recovery of activities in the fall. However, orders are expected to continue at a sufficiently high rate to make 1929 an outstanding year for the industry.

The automobile industry again has contributed substantially to current bookings. A manufacturer who is starting



work on a new eight-cylinder model has purchased special tools from a Cincinnati company amounting to about \$250,000. Another maker has placed considerable business with local plants in the past week. Several railroads are inquiring for miscellaneous lots of tools, and the carriers which are expected to buy soon include the Santa Fe, Norfolk & Western, Chesapeake & Ohio, Northern Pacific, Big Four and Wabash. Orders from the general industrial field have been well sustained.

Foreign sales of a few important builders have increased the past month. A liberal volume of scattered orders has come from South America.

Operations of local shops are being maintained at capacity and many plants are running large night shifts. Deliveries continue long extended, although this situation is somewhat better.

Plans have been filed by Columbia Machine Tool Co., Middletown Pike, Hamilton, Ohio, for one-story addition, 60 x 100 ft., for which general contract recently was let to Charles Lamm, Hamilton, to cost about \$22,000 with equipment.

Memphis Aviation & Transport Co., Memphis, Tenn., care of Harry E. Bovay, Dermon Building, recently organized with capital of \$200,000, plans operation of aviation training school, to include hangar, repair and reconditioning facilities and other buildings, to cost more than \$50,000 with equipment.

United Tractor & Equipment Corporation, Chicago, recently organized with capital of \$125,000,000 to take over Athens Plow Co., Athens, Tenn.; Brookville Locomotive Co., Brookville, Pa.; Muskogee Iron Works, Muskogee, Okla., and other organizations, is reported planning general expansion and development program at different units. Milton W. Anderson is president and general manager.

Board of Education, 2100 Linden Avenue, Middletown, Ohio, is said to be planning installation of manual training equipment in two-story junior high school to cost about \$450,000, for which bids will soon be asked on general contract. Thomas McLaughlin & Associates, 200 West Market Street, Lima, Ohio, are architects.

Mohawk Aircraft Corporation, Minneapolis, Minn., Lytton Campbell, president, is said to be planning branch plant at Chattanooga, Tenn., for parts production and assembling, to cost over \$30,000.

Ken-Rad Tube & Lamp Corporation, East Ninth Street, Owensboro, Ky., manufacturer of radio tubes and equipment, has awarded general contract to A. J. Hoffman Construction Co., Evansville, Ind., for four-story addition, to cost about \$100,000 with equipment.

Curtiss Flying Service, Inc., subsidiary of Curtiss Aeroplane & Mfg. Co., 74 Kail Street, Buffalo, has approved plans for hangar, with repair and reconditioning shop, at Bowman field, Louisville, to cost about \$50,000 with equipment.

Greaves Machine Tool Co., 2116 Cole-rain Avenue, Cincinnati, has removed to a new plant at Eastern Avenue and Hazen Street. Company manufactures a 24-in. geared-head engine lathe and gears for automotive and other uses. W. A. Greaves is president, William Howard secretary, and G. Byron Greaves treasurer.

Aluminum Industries, Inc., Cincinnati, manufacturer of aluminum alloy replacement pistons, has purchased Diamond Motor Parts Co., St. Cloud, Minn., maker of replacement parts for automotive in-

dustry, which has been operated under receivership for several months. Products of St. Cloud company will be marketed under name of Permite-Diamond through Detroit office of Aluminum company. F. J. Glennon, vice-president and sales manager of Aluminum company will be general sales manager. Products of Diamond company includes piston rings and pins; diechrome, cast iron and steel valves; spring and tie rod bolts; bronze and steel bushings; impellers and other pump parts.

## Indiana

**I**NDIANAPOLIS, April 1.—New interests have acquired plant and business of Allison Engineering Co., Main and Thirteenth Streets, Indianapolis, manufacturer of gas engines, parts, etc., with adjoining site of about 11 acres for expansion. New owners are planning to convert plant for manufacture of aircraft engines and parts.

Faultless Sash Holder Co., H. A. Busby, 20 East Twenty-second Street, Indianapolis, head, recently organized, is considering construction of one-story plant, to cost about \$28,000 with equipment.

Board of Education, Gary, plans installation of manual training equipment in new three-story and basement high school, to cost about \$900,000, for which bids will be received on general contract until April 9. W. B. Ittner, 911 Locust Street, St. Louis, is architect.

Fisher Paper Co., Fort Wayne, has plans for one-story machine shop and automobile service building, 75 x 150 ft., to cost about \$50,000 with equipment. A. M. Strauss, Cal-Wayne Building, is architect.

City Council, Terre Haute, Ind., is planning establishment of municipal airport, to cost about \$100,000.

Pacific Electric Mfg. Co., 5815 Third Street, San Francisco, manufacturer of high-tension switches and kindred electrical equipment, has awarded general contract to General Construction Co., 487 Broadway, Gary, for one-story addition to branch plant at Gary, to cost about \$55,000 with equipment. I. M. Cohen, 738 Broadway, Gary, is architect.

W. D. Allison Co., 905-7 North Alabama Street, Indianapolis, manufacturer of physicians' furniture and equipment, has purchased former plant of Stutz Fire Engine Co., Twenty-third Street and Belt Railway, totaling 50,000 sq. ft. floor space, and will remodel for new plant.

## St. Louis

**S**T. LOUIS, April 1.—Plans are under way by Wackman Welded Ware Co., 2412 South Seventh Street, St. Louis, for one-story branch factory, 50 x 200 ft., at Sand Springs, Okla., to manufacture steel barrels, to cost about \$65,000 with equipment. Louis B. Wackman is president.

American Eagle Aircraft Corporation, Fairfax district, Kansas City, Mo., has awarded general contract to W. K. Martin, Dwight Building, for one-story mechanical equipment shop, 60 x 100 ft.

Crago Gear & Machine Works, Kansas City, Mo., care of Edward C. Crago, 3545 Benton Boulevard, recently organized, plans operation of local plant to manufacture machine parts, gears, etc.

Oklahoma Gas & Electric Co., Oklahoma City, Okla., has plans for new

steam-operated electric generating plant on Arkansas River, near Ponca City, Okla., to cost more than \$600,000 with transmission system.

Pure Oil Co., 35 East Wacker Drive, Chicago, plans addition to refinery at Muskogee, Okla., to cost over \$150,000 with equipment.

Board of Education, Eighteenth and Louisiana Streets, Little Rock, Ark., has asked bids on general contract for three-story Gibbs industrial school, to cost about \$275,000 with equipment. Wittenberg & Deloney, Home Insurance Building, are architects.

Heckenlively & Mark, Landers Building, Springfield, Mo., architects, have revised plans for four-story and basement automobile service, repair and garage building, 83 x 100 ft., to cost about \$200,000 with equipment.

Wilcox Oil & Gas Co., Bristow, Okla., is reported planning new oil refining plant in Russell County, Kan., to cost more than \$175,000 with equipment. Another refinery is contemplated at Pampa, Tex., to cost over \$400,000. Work is in progress on additions to refinery at Bristow for handling about 3000 bbl. crude oil daily.

Travel Air Co., Wichita, Kan., is erecting three new one-story plant units, totalling about 70,000 sq. ft. floor space, to cost more than \$100,000.

Board of Trustees, University of Nebraska, Lincoln, has plans for power plant to cost about \$500,000 with equipment. Davis & Wilson, 525 South Thirteenth Street, are architects.

Lambert Aircraft Corporation, St. Louis, has acquired plant and business of Mono Aircraft Corporation, Moline, Ill., and will consolidate. Expansion in output will be carried out.

Corken Pump & Machinery Co., Oklahoma City and Tulsa, Okla., has been appointed district representative in Oklahoma for Dayton-Dowd Co., Quincy, Ill., maker of centrifugal pumps. Oklahoma City office will be in charge of O. K. and C. M. Corken, and Tulsa office in charge of W. H. Grandsen.

## Gulf States

**B**IRMINGHAM, April 1.—Kansas City Southern Railway Co., Kansas City, Mo., is said to be arranging for expansion at Dowling, near Beaumont, Tex., to include new engine house, machine shops, water and fuel storage and distributing plants and other units, to cost over \$500,000. A. N. Reece is chief engineer.

King Metal Products Co., Anniston, Ala., care of T. C. King, Anniston, recently formed by Mr. King and associates, is planning establishment of local plant to manufacture line of cast steel products.

Frazier Barrel Stave & Heading Co., Bank of Commerce Building, Memphis, Tenn., has acquired 15-acre tract at Charleston, Miss., and plans construction of new mill, to cost more than \$65,000 with machinery.

Menefee Airways, Inc., New Orleans, has plans for establishment of new airport, including hangars, repair and reconditioning shops, and other buildings, to cost about \$100,000.

Texas & Pacific Railroad Co., Dallas, Tex., and St. Louis, has plans for new engine house, machine and repair shops, and other units at Big Spring, Tex., to cost more than \$100,000 with equipment.

Capital City Auto Co., Inc., New Orleans, has arranged for erection of new

service, repair and garage building at Charles and Carondelet Streets, to be occupied under lease, to cost about \$100,000 with equipment. Jones, Roessle & Olschner, Maison Blanche Building, are architects.

Grasselli Chemical Co., Guardian Building, Cleveland, Ohio, subsidiary of E. I. duPont de Nemours & Co., Wilmington, Del., plans rebuilding part of plant at Birmingham, destroyed by fire March 22.

Board of Education, Lubbock, Tex., plans installation of manual training equipment in new high school to cost \$500,000, for which bids on general contract will soon be asked by Peters, Strange & Bradshaw, architects, Myrick Building, Luddock.

City Council, Lubbock, Tex., is arranging fund of \$75,000 for establishment of municipal airport.

Missouri-Kansas-Texas Railroad, Fort Worth, Tex., has plans for machine shop, 50 x 60 ft., mechanical service building, equipment storage and distributing unit and other structures at local yards, to cost about \$85,000 with equipment.

Dry Ice Corporation of America, Inc., 50 East Forty-second Street, New York, manufacturer of freezing materials under special process, is planning establishment of new plant at Jacksonville, Fla., to cost about \$90,000 with machinery. Company is affiliated with Liquid Carbonic Corporation, 3100 South Kedzie Avenue, Chicago.

Simms Oil Co., Dallas, Tex., has authorized extensions in refinery on Eagle Ford Road, to cost about \$30,000. Additional equipment for handling crude oil will be installed.

Carnation Milk Products Corporation, Oconomowoc, Wis., is planning for a new milk-condensing plant at Schulenburg, Tex., to cost about \$250,000 with machinery; automatic canning equipment, capping machinery, etc., will be installed.

## Pittsburgh

**P**ITTSBURGH, April 1.—The Westinghouse Electric & Mfg. Co. is inquiring for its second quarter tools in sections; the first part contains about 20 items, while a second includes about 10 tools. Inquiry for some others will be made as soon as the activity of the departments for which they are wanted subsides sufficiently to permit making up requisitions. Local dealers still have much business before them and current orders are of satisfactory proportions.

Plant construction work by the National Tube Co. at McKeesport, Pa., A. M. Byers Co. at Ambridge, Pa., and Weirton Steel Co. gives promise of machine tool orders. The Carnegie Steel Co. has plans for betterments at its several Monongahela River plants and at Farrell, Pa., and the Republic Iron & Steel Co. is expected to make expenditures in the Youngstown district.

Fokker Aircraft Corporation of America, Glendale, W. Va., is reported planning new plant near San Francisco, for parts production and assembling for Pacific Coast trade, to cost more than \$100,000.

Aero Supply Mfg. Co., New York, has purchased Standard Automatic Products Co., Corry, Pa., and National Steel Products Co., Dayton, Ohio, both manufacturers of aircraft equipment and supplies, and will consolidate. Purchasing com-

pany has authorized increase in capital from 65,000 to 500,000 shares of stock, no par value, part of fund to be used for expansion.

Abanda Furnace Co., Pittsburgh, recently organized by Kenneth R. Cunningham, 65 Bartlett Street, and associates, plans operation of local plant to manufacture heat-treating, annealing and melting furnaces and parts. A. S. DeChant, 814 Adelaide Street, is also interested in organization.

Thomas Flexible Coupling Co., Warren, Pa., has awarded general contract to J. J. Guinnane, Jamestown, N. Y., for three one-story units, 60 x 200 ft., 40 x 100 ft. and 40 x 60 ft., to cost about \$65,000 with equipment.

Kerotest Mfg. Co., 2525 Liberty Avenue, Pittsburgh, manufacturer of brass and steel valves, has awarded general contract to Cuthbert Brothers, Bessemer Building, Pittsburgh, for three-story addition to machine shop, to cost about \$100,000 with equipment. James T. Steen & Sons, Vandergrift Building, are architects.

National Erie Co., Erie, Pa., recently organized to take over National Foundry Co., with local plant for production of steel castings, and Williams Foundry & Machine Co., Akron, Ohio, manufacturer of rubber mill machinery and castings, has disposed of stock issue totaling \$750,000, part of proceeds to be used for expansion. Company has authorized construction of one-story machine shop at Erie, 150 x 345 ft., to cost more than \$125,000 with equipment.

## Pacific Coast

**S**AN FRANCISCO, March 28.—Contract has been let by Atlas Iron Co., Eastern and Randolph Avenues, Los Angeles, to Myers Brothers, 142 North Toluca Street, for one-story unit, 60 x 180 ft., to cost about \$27,000 with equipment.

Kinner Airplane & Motor Co., Los Angeles, is arranging for expansion to cost about \$50,000; additional machine tools and other equipment will be installed. R. S. Porter is chairman of board.

Willard Storage Battery Co., East 131st Street and St. Clair Avenue, Cleveland, has taken options on 10-acre tract near Los Angeles, as site for new plant, to cost about \$450,000 with equipment. Local offices are at 1601 South Hope Street.

Telluride Power Co., Provo, Utah, is planning new steam-operated electric power plant in Sevier Valley section, near Richfield, Utah, to cost about \$200,000 with equipment.

Bach Aircraft Corporation, 1010 Washington Building, Los Angeles, has awarded general contract to George Chapman, 6262 Van Nuys Boulevard, Van Nuys, Cal., for second unit of plant at Metropolitan airport, Van Nuys, one story, 100 x 100 ft., for assembling, to cost about \$40,000. Mark M. Falk is company engineer, in charge.

A. L. Maxwell, Palouse, Wash., and associates are organizing company with capital of \$250,000 to construct and operate local mill for production of pulp. Initial unit will cost about \$150,000 with equipment.

Western Steel & Foundry Co., Midvale, Utah, referred to in these columns last week in connection with addition to cost \$175,000, has taken over local plant and business of Western Steel Co. and will develop large output for heavy steel cast-

ings. Company was chartered recently under State laws with capital of \$310,000.

Western Sulphur Industries, Inc., Los Angeles, is carrying out an expansion program at local plant and at branch works at Oakland, Cal., and will install considerable new equipment. Theodore J. Dosch is vice-president.

Lyon Metal Products Corporation, 337 South Anderson Street, Los Angeles, has awarded general contract to William P. Nell Co., 4814 Loma Vista Avenue, for one-story storage and distributing plant, 85 x 177 ft., to cost about \$27,000 with equipment.

Master Wire Lathe Co., 6100 South St. Andrews Place, Los Angeles, has been organized to succeed Master Metalath Mfg. Co., which in last three years has developed new method and machinery for manufacturing woven wire in form of sheet lath. New plant has just been completed to replace one formerly operated by predecessor. Company will purchase 16-gage wire, asphalt and building paper. Robert Burhans, Jr., is president.

## Canada

**T**ORONTO, April 1.—Demand for machine tools continues active and in good volume. A large part of the current business is for replacement with most orders calling for two or three tools. Inquiries are coming out for equipment for new industrial developments from many sections of the Dominion. According to local builders and dealers, the prospective demand for tools and machinery was never better.

Toronto Iron Works, Toronto, has applied for permit to erect a new plant on Eastern Avenue. When completed and equipped it will represent an expenditure of \$500,000.

Officials of Holmes Foundry Co., Ltd., Port Huron, Mich., have announced that company's foundry at Sarnia, Ont., will be reopened this week. Plant has been closed for eighteen months, during which time considerable new equipment was installed. Company manufactures parts for the Ford Motor Co. of Canada.

Ferranti Electric Co., 26 Noble Street, Toronto, has secured a site at Mount Dennis, Ont., for erection of a new plant. Ewart, Armer & Byam, Ltd., is architect and engineer.

Canadian Steel Corporation, Ltd., Ojibway, Ont., is planning for an addition to cost \$40,000.

Burlington Steel Co., Hamilton, Ont., has awarded general contract for new building to W. H. Cooper, 6 Hughson Street.

Sam Foxworth, 616 Waterloo Street, has contract for addition to factory of Hygrade Corrugated Products, Ltd., London, Ont., to cost \$40,000.

Several contracts have been awarded for an addition to Johnston Wire Works, Dagenais Street, Montreal, to cost \$20,000.

Town Council, Dalhousie, N. B., will spend \$37,000 on additions and improvements to electric light plant.

### Western Canada

Waterous, Ltd., Brantford, Ont., manufacturer of pulp mill equipment, boilers, engines, wood-working machinery, etc., has purchased plant and property of Edmonton Iron Works, Edmonton, Alberta, and will remodel and equip at expenditure of \$60,000.



Hutton & Souter, Hamilton, Ont., has plans for construction of a parts and service plant at Regina, Sask., for General Motors Co. of Canada, Ltd., Oshawa, Ont.

## Foreign

**A**N appropriation of \$8,400,000 has been arranged by Central Argentine Railway Co., Buenos Aires, Argentina, for electrification of suburban lines from Buenos Aires to Tigre and vicinity.

Ford Motor Co. of Holland, Rotterdam, has taken over tract of about 28,000 sq. meters in harbor section, and will erect assembling plant to cost more than \$750,000. It is proposed to remove present works at Antwerp to new location. Company was formed recently with capital of 5,000,000 florins.

Leningrad Economic Council, Leningrad, Russia, is planning for new steam-operated electric generating plant, using peat as fuel, with capacity of 240,000 kw. to cost more than \$1,500,000.

Panama Power & Light Corporation, Panama, Panama, an interest of American & Foreign Power Co., 2 Rector

Street, New York, is planning construction of new equipment storage and distributing plant, with service and repair facilities, to cost about \$250,000 with equipment.

Baglan Bay Tinplate Works, Briton Ferry, South Wales, Great Britain, is said to have plans for four new tin plate mills to cost over \$1,000,000.

Crown Cork International Corporation, an interest of Crown Cork & Seal Co., Baltimore, is arranging an expansion program, to include acquisition of three allied companies in England, manufacturers of metal bottle caps, capping machines, etc., and consolidation of production at two main plants in that country. A company and plant in Spain will be taken over and capacity of factory increased. Crown company will also take over a subsidiary in France, as well as producing company in Germany.

La Quimica Industrial de Argentina, Buenos Aires, Argentina, recently formed as subsidiary of Consolidated Chemical Industries, Inc., San Francisco, has begun preliminary work for new plant for production of glue, sulphate of ammonia, phosphates and kindred specialties, to cost about \$750,000 with equipment.

\$28.40 in 1923 to \$30.34 in 1925 and \$31.31 in 1927, being thus consistently lower than in foundries. Hourly earnings advanced from 55.9c. to 60.2c. and 62.5c., which were almost identical with the foundry rates. The week was shorter for the machine shops, however, the three years having shown respectively 50.8, 50.4 and 50.1 hr. as a week's work.

## Car Requirements Will Be Large in Second Quarter

WASHINGTON, April 2.—Iron and steel shipments during the second quarter will require 531,345 cars, according to an estimate of the Shippers' Regional Advisory Board, making an increase of 10 per cent over the 483,033 carloads required during the corresponding period of last year. Coal and coke requirements are estimated at 2,645,556 cars, an increase of 14.7 per cent over the 2,305,911 cars during the second quarter of 1928. Machinery and boilers will require 261,385 cars, it is estimated, an increase of 9.5 per cent over the 240,923 cars for the second quarter of last year, while requirements for ore and concentrates are placed at 602,841 cars, an increase of 8.3 per cent over the 556,575 cars used in the second quarter of last year.

## Shipments By Members of Barrel Institute

February shipments of steel barrels by members of the Steel Barrel Manufacturers' Institute totaled 372,528. The volume of business for the month is given as \$1,192,425. Unfilled orders on hand at the end of the month called for a total of 493,290 units. Productive capacity was engaged during the month at an average of 42.6 per cent. Capacity for I. C. C. barrels was engaged to the extent of only 27.7 per cent, against 46.5 per cent for light barrels.

This supplements the general data carried on page 836 of our March 21 issue.

## Pig Iron Imports Are Double Those of Last Year

WASHINGTON, March 29.—Making an increase of 191 tons, imports of pig iron in February were 16,299 tons, against 16,108 tons in January. For the first two months the total was 32,407 tons, an increase of 14,893 tons (85 per cent) over the 17,514 tons imported during the corresponding period of last year. India was the leading source of supply, with 6974 tons during February and 14,289 tons dur-

ing the two months. Shipments from the United Kingdom were 4540 tons and 9790 tons respectively, and from the Netherlands, 4349 tons and 7440 tons.

## Foundry and Machine Shop Wages and Hours

Bulletin 471 of the United States Bureau of Labor Statistics gives a survey for 1927 of wages and hours in 417 foundries and 526 machine shops. The number of wage earners covered in the study was nearly 39,000 in the foundries and 87,000 in the machine shops. Comparisons are made with similar studies made in 1923 and 1925.

Average full-time weekly earnings in the foundries had advanced for all occupations from \$29.24 in 1923 to \$31.42 in 1925 and \$31.89 in 1927. Average hourly earnings increased at a somewhat higher rate, from 55.8c. to 61c. and 62.4c. Meantime the average full-time hours were declining from 52.4 to 51.5 and 51.1 for a week.

Conditions in the machine shops showed a similar tendency, with a steady rise in weekly and hourly earnings and a similar but less pronounced drop in length of working hours. Weekly earnings advanced from

## Manufacture and Sale of Tractors in 1928

Data collected at the annual canvass of manufacturers of farm equipment show total production of 171,137 tractors in 1928, valued at \$161,461,462. Of this total, 152,124, valued at \$113,730,502, were of the wheeled type, and 19,013, valued at \$47,730,960, were of the track-laying type. Of the tractors sold by manufacturers, 99,491, valued at \$98,528,923, were for use in the United States, and 48,806, valued at \$42,220,807, were sold for export.

## Record Daily Output of Petroleum

Production of petroleum in the United States in February is reported by the Bureau of Mines at 75,693,000 bbl., compared with 81,979,000 bbl. in January. Because of the shorter month, this represented an increase in the daily average from 2,644,500 bbl. to 2,703,300 bbl. This constitutes a new high record and shows an increase of 14 per cent compared with the daily figure of February, 1928.

The survey department of the Structural Steel Board of Trade, Inc., Grand Central Terminal, New York, figured 298 jobs during 1928, involving 277,600 tons. The cost to the department was \$35,726 or 14c. per ton. The average number of bidders per job was 6.2.

IMPORTS OF PIG IRON BY COUNTRIES OF SHIPMENT  
(In Gross Tons)

	February		Two Months Ended February	
	1929	1928	1929	1928
United Kingdom .....	4,540	50	9,790	3,800
British India .....	6,974	3,794	14,289	9,428
Germany .....	50	...	53	40
Netherlands .....	4,349	2,154	7,440	3,600
Canada .....	95	93	259	265
France .....	...	...	...	...
Belgium .....	33	197	184	197
Norway .....	50	...	101	...
Sweden .....	177	39	227	95
All others .....	31	60	64	89
Total .....	16,299	6,387	32,407	17,514

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